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JULY 1972
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AMERICAN aircraft modeler

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A New Approach to RC in a Free Flight Model—
Perhaps an Event. See page 20

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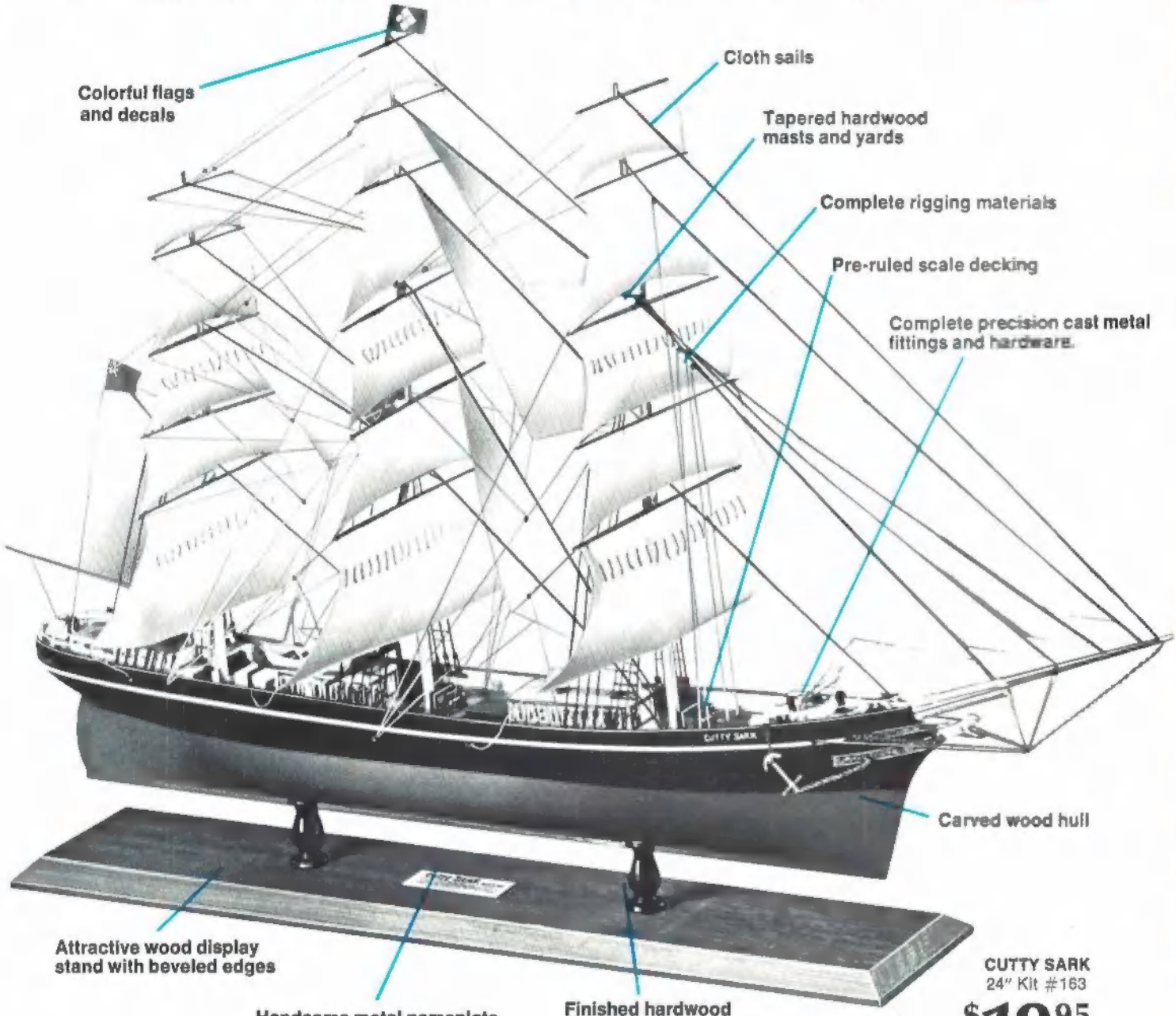

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Cover Photo: A beautiful role for a beautiful ship. The glider-like U-2 serves peaceful missions for NASA. Photo by Monty Groves.

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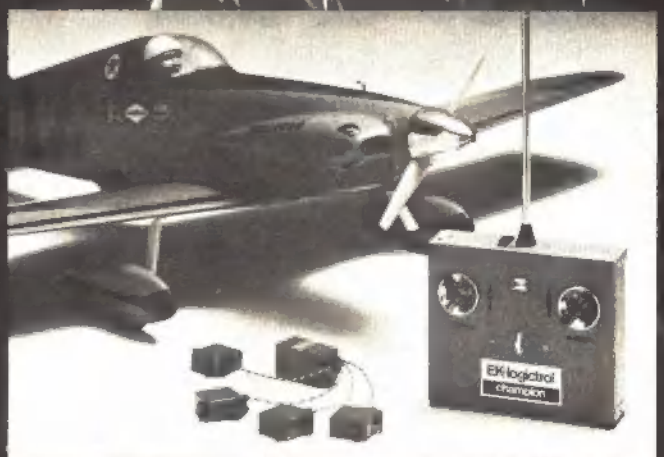

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straight and level

SUPPOSE YOU WERE TO ADDRESS A MODELER'S UNITED NATIONS. WHAT WOULD YOU SAY?

On a warm Sunday springtime afternoon, when one should at least be out watching the models fly, there's a temptation to fly the typewriter, rather than make the typewriter keys fly. "There I was at 30,000," the fighter pilots often yarned after World War II—or so it was said humorously by the bystanders who nevertheless stuck around to listen. They still do, we can safely guess.

So, feeling like Snoopy, we are buzzing the air-show runway in our Bearcat, pulling up into a magnificent eight-point roll as done by Grumman test pilots at old Mirror Meets. Or a two-mile-high loop, like a trip around the world, in a silvery Lockheed Lightning sparkling in the sun. Actually, in case you've been conned by our airborne Hermes, the writer flew Cubs quite sloppily. If you can recognize an eight-pointer or even a round loop in this metaphorical flight of fancy, you deserve to make a stick-and-paper model for soul.

Let's assume that *you* are about to address a conclave of international modelers. Maybe you won some FAI event with your high-speed "bomb," or did 45 minutes with an indoor jobbie in that famous saltmine. Or maybe you've been invited because you are international modeling's greatest goofer-upper.

So in the audience are grimly proper men, the statesmen types who attend modeling's United Nations meetings—that's the C.I.A.M. And there are contestants, their teammates, all the finest craftsmen, competitors and men to be found anywhere. They are people of all races and most nationalities. Silent nationalistic types who proudly bear on their shoulders the country prestige when they stand on those one-two-three winner stands under snapping flags while cameras fire away, and excitable guys from hotter climes who have a soccer-man's fire. What would you say to them? What would anyone say to them, be he Russian, Hungarian, Frenchman, Englishman.

Who knows? But we may think. In a world that is surely going mad—population explosion, ecology, and a squabbling family of nations—there are sadly hopeful gestures that recognize that we all will either live together or, to lift a famous quote, "we will certainly hang separately." Musicians go to Moscow, and Russian dancers to America. Pandas and ping-pong players, from China. Cultural exchanges and tourists in all directions. Yet there are some who never talk to each other—except on the model airplane field.

Here at this meet people really mix in an amazing camaraderie. They share a common bond of knowing that all of them see, hear and feel the same things when they fly, whether at home in the cold northlands, or the hot tropics, or right here at this now-over contest, and at the clean-clothes meeting you are about to address. It matters not that some had been isolated in training like professionals, or that AMA members wisely finance our teams to travel, far out of proportion to what other population segments do for their sporting interests.

(Continued on page 69)

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modeler mail

Enough is enough!

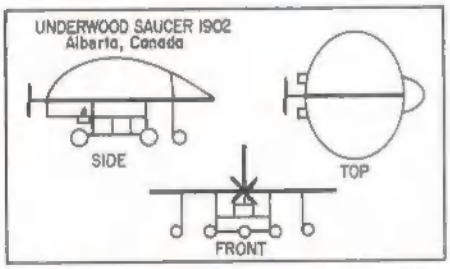
Let us hear no more of one part of model aviation putting another part down. It proves nothing, and only helps breed divisiveness when it is not needed. You don't enhance the image of "your thing" when you belittle "someone else's thing."

Each aspect of model aviation takes its own skills, probably different but no less challenging than other aspects. As it stands now, I could no more build and successfully fly a competition grade free flight model than a free flighter could build and fly something like my 60-powered full-house multi. By no means does that lessen the skill required to do either one. Please, no more!

Milt Woodham, Huntsville, Ala.

Almost first to fly

I would like to point out an error in Douglas Ingell's article, "Edsel's Folly" (May 1972 AAM). He claims that the runway at the Ford farm was "probably the first airport runway in the world." In 1902 the Underwood brothers built an airfield in Alberta, Canada. It consisted of a smoothly rolled dirt field to be used by their "Saucer" which never flew because of too little power. Had it flown, the Underwoods would have been the first to fly.



The "Saucer" had an oval wing which was built of laminated spruce. The covering could be rolled back in windy weather. The pilot sat in a box beneath the wing. The 9HP engine was mounted on the box and drove a four-blade prop by a long shaft and drive belt. Stability was achieved by the large fin. It also had the first ailerons. The three Underwood brothers used the "Saucer" as a kite after their attempt to fly failed and eventually wrecked it.

Michael Galinski, Montreal, Quebec, Canada

Request from Czechoslovakia

I have seen an issue of your magazine and it is very good. I would like some more copies of AAM, but I cannot buy them here in my country. I would like to exchange American Aircraft Modeler for our Czech model magazine, and I also want to have a pen pal friend in the USA. I can correspond in English and French. I would be very pleased, as this is the only way I can obtain more of your magazines.

I am nineteen years old and my work is servicing cars. My favorite categories are RC gliders and powered models. I am now flying an A2 Nordic.

Jan Karlik, U slunce 407/IV, Katovy, Czechoslovakia

Tenderfoot help

I am 14 years old and have been building models for about a year now. Two of my neighbors are model airplane builders—Bill Harris and Frank Ehling. I didn't know they built models until about a year ago. I can manage pretty well on my own now, but when I run into a problem I need their help.

A lot of kids aren't as lucky as I am and they can't get help, so why not make the Tenderfoot projects in AAM for the *true* beginner, not for the advanced Tenderfoot?

I like your magazine very much, but you should help the Tenderfoot more.

Mark Ashby, Laurel, Md.

Read **Junior American Modeler** *It is THE answer for you!*

—Publisher

Field finish

Recently our flying club acquired the use of an area for a flying field. This area is smooth and unimproved with a sandy clay soil surface. A debate has been going on among our club members about various ways to improve an area of this field for a flying strip. We were wondering if others might have some recommendations for putting in a strip.

Since the land is on loan, there are limitations to what improvements we can make. A number of our members are in favor of a grass strip and we were wondering if there is any grass which would be suitable for such a purpose and could survive with a minimum of watering. Other members of the club favor a smooth strip and were wondering if you had any ideas for development of a semi-permanent strip.

Any information other readers or clubs have on the subject would be deeply appreciated.

Jim Cooney, Blue Mountain Aero-Modelers, 428 Tyler Way, Missoula, Mont. 59801

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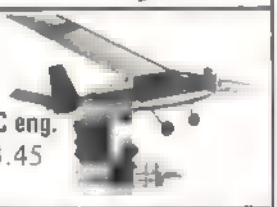

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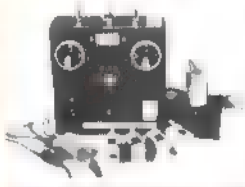

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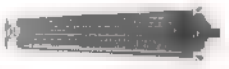

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FORTY-EIGHTH IN A SERIES

getting started in RC

by JIM McNERNEY

THIS FAMOUS SERIES BEGINS ALL OVER AGAIN WITH A NEW AUTHOR AND A NEW APPROACH TO GETTING STARTED.

Since Howard McEntee began his series in 1967, the radio-controlled model field has literally exploded. In these few short years we have seen the growth of reliable, multi-function digital proportional systems, widespread use of integrated circuits and advanced solid-state technology, wide use of auxiliary functions such as flaps and retractable landing gear, radio sets being manufactured and sold by the tens of thousands. A whole army of new RC enthusiasts have joined our ranks. Witness the record size of the Academy of Model Aeronautics, the advent of RC car racing and new interest in RC boating. It seems to be the appropriate time to re-start the series with an eye toward the modern enthusiast. We hope to answer some of the more common questions such as: "What do I need?", "What must I learn?", "Where do I go?", and the ever-present "How much?" Some of this will be "old hat" to you over-the-hill guys, but bear with us—we all had to start sometime, and some of you fellows could use a refresher. Comments, criticism and ideas on helping RC neophytes will be appreciated.

What aroused your interest in RC? Did you see a demonstration at some civic event? Did you happen by a club field and watch those models doing impossible things? Maybe you visited the local hobby shop or picked up a model magazine just out of curiosity. Now you're saying to yourself, "How can I get in on the action?" You're already started in the right direction—you bought this magazine. But it's not all in the book. There are many good treatises on RC. Books by Howard McEntee, Ken Willard and others are available. Some of the information is dated because this is a dynamic hobby, but the fundamental laws of aerodynamics and electronics haven't changed.

Many other things have changed though. If you used to play with models fifteen or twenty years ago—or even ten years ago—you are in the Dark Ages. Balsa, silk and dope are still around, but are rapidly losing ground today to plastics, fiberglass, foam, epoxies, polyesters, acrylics and other exotic materials. Prices have changed too. The old $5.00 "gas model" is no more. RC kits are mostly in the range of $10 to $100, with the large percentage in the $50 bracket. Today's kits are normally better engineered, better produced and more complete than their 20-year-old counterparts. There is also a whole new field of almost-ready-to-fly or ARF aircraft. These planes have preformed and covered fuselages, wings and empennage. They require a minimum of construction effort plus installation of an engine, radio, landing gear and control system. Things not normally included in any kits are: wheels, fuel tanks, engine, radio, and liquids (adhesives and paints). Many kits do not include all hardware, such as clevises, control horns, linkages, collars, nuts and bolts. The outlay for the missing items can run as high as, or higher than, the cost of the original kit. This can come as a shock to a novice who has planned carefully to procure his first outfit and has not budgeted for all the "goodies."

Your choice of a first model is extremely important. If you have success with this first model, you can accept future failures, but lack of success at an early stage may sour you on the hobby. So don't stack the cards against yourself. Here are a few guidelines for choosing your first model.

The model should be inherently stable, preferably a high wing design with plenty of dihedral. Then if you misguide it into a hairy attitude, you can let go of the controls and, with enough altitude, the airplane can sort itself out. Use a proven design—there are plenty of them around. Some gliders make good trainers due to slow speed, relatively low initial investment and reasonable crash survival. Not all gliders meet these requirements.

The design should be strong but relatively simple to build. Slab-sided fuselages and flat-bottomed airfoils make for ease of construction, but some flat-bottomed airfoils have undesirable characteristics. A semi-symmetrical airfoil is alright if some means is provided to ensure building a straight wing. Consider use of the new heat shrink coverings, which, although a bit expensive, are relatively "goof-proof" if directions are followed carefully.

Limit the number of control functions. There is a trade-off here between the minimum required to control the airplane and the maximum that one can keep track of as a novice. For many years RC was limited to rudder control only or rudder and throttle control. Another popular configuration for beginners is rudder, elevator, throttle; or aileron, elevator, throttle. "Full house" has traditionally meant rudder, elevator, aileron and throttle control. Additional functions such as operating flaps and retractable landing gear can be added, but you don't need these when you're learning how to fly. However, you can purchase a six function radio and fly with one, two, three or four functions until you're ready to get fancy.

(Continued on page 64)

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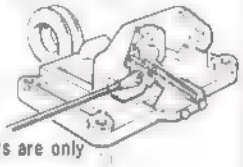
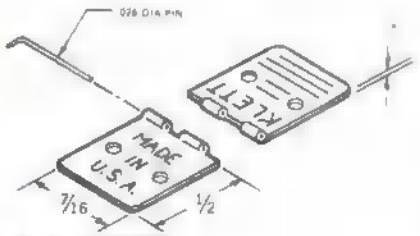
FORGET THE LOW PRICE. When you want dependable retract performance, find out why the leaders use CG Retracts. People like Terry Prather (current FAI record 1:48), Jack Stafford, Nick Ziroli, Pete Reed, Garry Korpi, Bud Atkinson, and many others use Carl Goldberg Retracts.



LOWEST PROFILE—Main Gears are only 1" high.
LIGHTEST—Nose Gear, Mains, and 3 Struts, only oz.
BROADEST BASED for best stress distribution.

TOUGH—Rugged vibration absorbing nylon moldings. Large bearing surfaces.
SHORTEST TANK COMPARTMENT—Nose Gear needs only 5½" to 6".
SIMPLEST—Main Gear has only 3 molded parts.
EASY—Installation or Strut Removal. Low actuating force—one retract servo can easily actuate all three units.

Pair of Main Gear Retracts—**$ 9.95**
Set of Nose Gear & Mains—**$19.95**



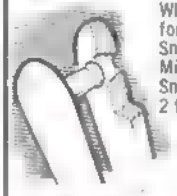
KLETT NYLON HINGES—THE NEW BREAKTHROUGH

Designed and Manufactured by Roy Klett, Originator of the World-Famous RK Hinges!

An exclusive with Carl Goldberg, here is extremely strong smaller hinge constructed with exceptional care and attention to detail. So thin that all you need is knife slit. Top quality, yet only cost **$1.95** for 15 and **$1.10** for 7.

UNIQUE SNAP-LINK! Patent Pending. Now for the first time—you buy a truly safe link—the SNAP-Link! Note these features:

- Tiny 45° shoulder snaps through arm, prevents accidental opening. So unique it's Patent Pending!
- One-piece design—no separate pieces that might come apart.
- Proven tough nylon molding—takes tremendous stress, prevents metal electrical noise.
- Self-friction fit on threads—no need of a nut to prevent change of adjustment or vibration threads.

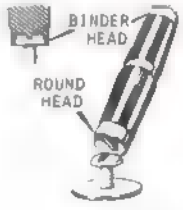


When you want SAFE link . . . ask for SNAP-LINK!
Snap-Link, Regular, with rod } **29¢** each
Mini-Snap-Link, with rod
Snap-Link or Mini-Snap, less rod 2 for **40¢**

STEERABLE NOSE GEAR

Versatile—steering can be to either side, slightly up or down, or mounted on bottom with extra collar in slot. Steering arm is nylon, stiff enough for good control, yet can flex under shock protect servo. Collar is hardened steel—won't strip like brass. Screw is hardened steel, too. You really torque it get good grip music wire strut without a flat.

Complete steerable with nylon bearing, 3/32" plated music wire strut, extra collar, blind nuts, screws and washers—**$2.50**.



NOW from Roy Klett the NEW KLETT SAFETY DRIVER SOCKETS DOWN ONTO SCREW HEAD—CAN'T SLIP OFF DAMAGE YOUR WING!
One takes Round Screws, other end takes Binder Head.

KLETT SAFETY DRIVER
Large for ¼" Nylon Screws } **98¢** each.
Small for #10 Nylon Screws

NEW—MAJOR R/C FITTINGS SETS

Here's the economical way to buy the major fittings for your multi-ship. In set, you get all the horns, links, keepers, bellcranks, or strip aileron linkage, and hinge material—and at saving.

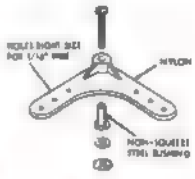
R/C Fittings Set No. 1 for ship with standard ailerons—**$3.50**
R/C Fittings Set No. 2 for ship with strip ailerons—**$3.50**

NYLON BEARING

One-piece design mounts to firewall without alignment problems. Includes blind nuts, and washers—**75¢**.

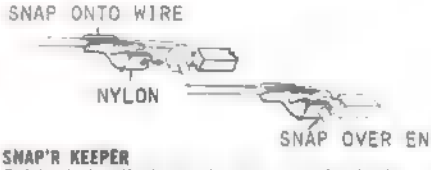
CONTROL HORNS

Our new horns have the upright part rising from the center of the base for maximum stability. Holes are right size for 3/32" wire; nut plate for simplest mounting. Long horns short horns, with screws—**50¢** for .



AILERON BELLCRANK

Bellcrank has steel bushing of proper size, so crank can be screwed firmly in place without binding. No electrical noise—all metal parts are screwed tightly together—**50¢** for .



SNAP'R KEEPER

Quickest, handiest way to secure pushrod wire end to servos, horns, etc. Works on wire 3/64 to 5/64" diameter—**50¢** for 4.

NYLON STEERING
Hardened steel collar and screw—**75¢**.

REPLACEMENT FOAM WINGS, ETC.

To with your design fuselage. Proven efficient Ranger 42 foam wing gets you in the air quickly—**$3.95**. Stab and vertical fin, set **$1.95**. Assembled Ranger 42 fuselage, plus bearers, nosegear, etc., **$8.95**.

NYLON TAPE

This nylon reinforcing tape is extremely tough when applied with epoxy around the center when joining wing halves. 2½" wide x 5 ft.—**50¢**. ¾" wide x 5 ft.—**25¢**.

½A BELLCRANK and
Made of nylon, this new set provides smooth ½A control line operation. Easy on dacron lines, too —**25¢**.

SHEET METAL SCREWS

Like wood screws, but better. Sharp, clean, full-depth threads, hard and strong. Excellent for mounting servos, etc. Includes washers—#2 x 3/8—**30¢** for 10; #4 3/8—**30¢** for .

P.S. For best service, see your dealer for items you want. If not available, write direct; add 35¢ per item (75¢ outside U.S.). Minimum order $1.

MANUFACTURERS—All our accessories are available at excellent O.E.M. bulk prices.

AVAILABLE IN CANADA

Carl Goldberg Models Inc.
2545 W. Cermak Rd., Chicago, Ill.
I am sending 20¢ for 8 pg. Illustrated Catalog with, "Recommendations in Starting in R/C," Basic Explanation of R/C Equipment and Radio Control Definitions.

Name_____
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CARL GOLDBERG MODELS INC.
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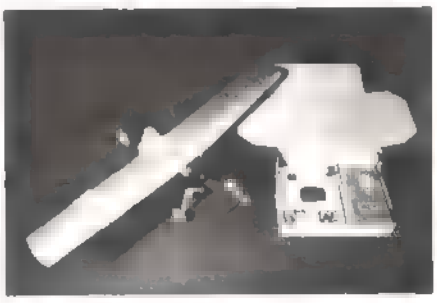
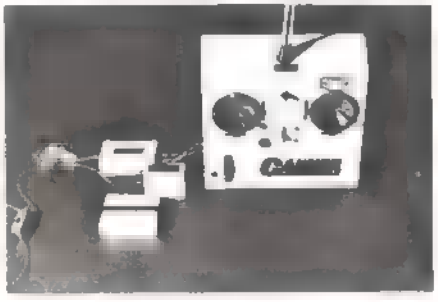
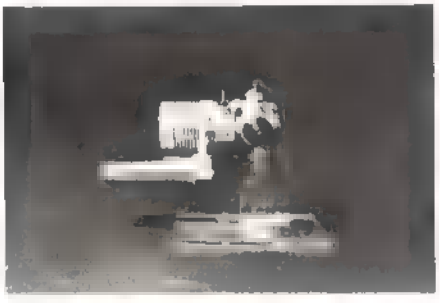
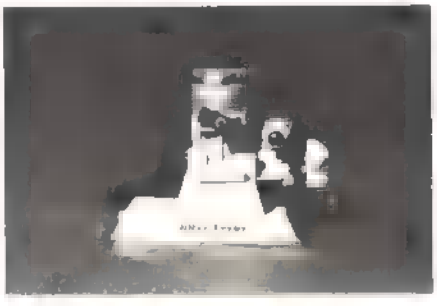
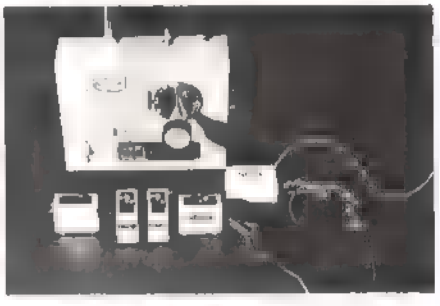
new products check list











Sterling Models/RC Trainer. For the RC beginner or the more advanced Sunday afternoon flier, *Fledgling* is an easy-to-build, good-looking high wing sport plane with lots of unusual features. Fuselage [redacted] one-piece side panels with plywood doublers, pre-carved top for fast, accurate, but extra-strong construction. One-piece balsa-covered wing uses pro-quality nylon screw mounting in hardwood maple nut block. Torsion main gear and sprung nose gear included but Fledgling can also be flown as a tail dragger. Solid balsa fin and rudder, balsa-covered built-up elevator, tapered strip ailerons, aluminum engine mount, pre-cut balsa, plus plenty of room for RC installation makes this 56" span model a particularly good value. For 23 to 40 engines. $24.95. Sterling Models, Sterling Building, Belfield Ave. and Wister St., Philadelphia, Pa. 19144

Dembros/*Waveking* flying boat. Top quality fiberglass hull and foam wings, tail and control surfaces. 75" span, 63½" overall length, 6½ lb. dry weight. Includes fiberglass tip floats and engine nacelle. Almost-ready-to-fly, requires only RC installation, paint and trim, $92. Dembros, 58 Lake St., Nashua, N.H. 03060

Al's Hobby Shop/Muffler. Stainless steel airfoil shape, lightweight, approximately 2 oz. for 50 to 60 size. Efficient quieting, [redacted] db registered only 15 ft. from engine. 50 to [redacted] and 29 to 40 sizes, $12.95; 15 to 23 size, $10.95. Al's Hobby Shop, Box 449, Elmhurst, Ill. 60126

Ace R/C/*Skampy*. For those who have mastered rudder-only flying and are looking for new worlds to conquer, *Skampy* provides an extra challenge. Goodyear-inspired design, 30" span, flies great with 020 power and Baby Twin Pulse system. Tapered foam wing, band-sawed hardwood and balsa parts, torque rod, pre-formed landing gear wire, hinge material included in kit. Best flying weight, 12 to 13 oz. Ace R/C, Higginsville Mo. 64037

Cannon/Pro Series 6-channel RC. Two-stick Professional system [redacted] available in 4-, 5-, and 6-channel versions. Features buddy box, separate logic and RF circuit boards, 17 discrete frequencies available by switching RF boards. 750-mw output on 27 MHz bands, 350 on 53 and 72 MHz bands. Four-channel receiver convertible to five-channel operation. Avail-[redacted] in kit [redacted] ready-assembled form, airborne weight, 8.6 oz. Six-channel system with four servos, already assembled, $339.95. Cannon Electronics, 13400-26 Saticoy St., North Hollywood, Calif. 91605

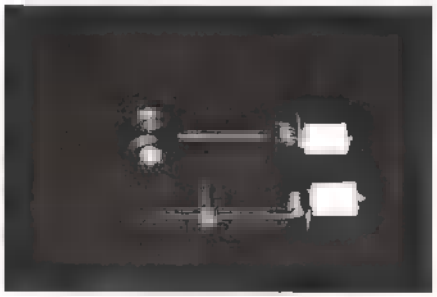
OPS-Shamrock/60 engine. New 60R/C *Ursus* uses Schnuerle directional porting, hemi combustion chamber, squish-band head. Bore, .94; stroke, .87; displacement, .60; weight, 17.5 oz. High-performance competition power, $79. Shamrock Competition Imports, Box 26247, New Orleans, La. 70126

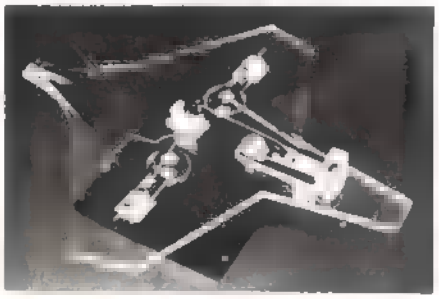
Midwest/Spinners. Full line of "True Running" spinners in red, yellow, black, white in 1-3/4, 2, 2-1/4, 2-1/2, 3-1/2" including "P51" type in 3-1/2" size. Price from $3.60 to $7.95. Midwest Products Co., 400 S. Indiana St., Hobart, Ind. 46342

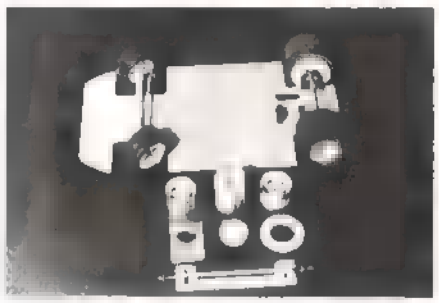
J [redacted] J Industries/*Banshee*. Sleek, high-performance 60-powered aircraft has impressive series of contest wins. *Banshee* features high-grade balsa construction, pre-cut wing tips, ribs, formers, fin, rudder, aluminum engine mounts, pre-formed canopy, full length fuselage sides. 62" span, about 7½ lb. with retract gear. $54.95. J [redacted] J Industries, Inc., Box 202, Oakhurst, N.J. 07755

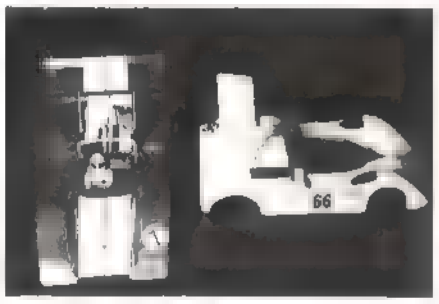
Royal/Classic single-stick RC. Top-of-the-line equipment provides aileron, elevator, rudder control with stick, throttle control beneath left hand. Dual charger, wide selection of servos. Optional gear retract control and associated servos available. 16 frequencies available on 27, 53, 72 MHz bands; .7 watt power [redacted] 27 and 53, .4 watt on 72. 4-channel 27 MHz system, $255; 53 MHz, $260; 72 MHz, $265. Royal Products Corp., 6190 E. Evans, Denver, Colo. 80222

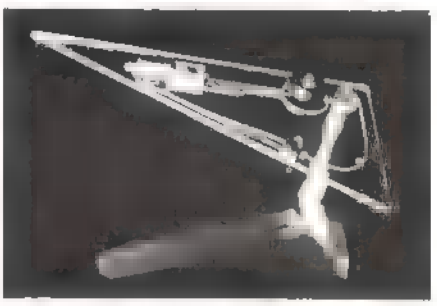
by FRANK PIERCE











BK Model Products/Retracts. Nose and main gear require only 1-1/8" vertical clearance for mounting, have adjustments for servo travel, nylon bushings for low friction operation, no metal-to-metal contacts, adjustable wheel hubs. Nose unit, $19.95; Main gear, $15.95 ea.; $49.95 for three. B.K. Model Products, 4765 E. Iliff Ave., Denver, Colo. 80222

Marker/Racing chassis. Less engine, RC equipment, body, chassis features brake, heat-sink, RC mounts, suspension, 4-to-1, 6-to-1 gear ratio. 19 power recommended. Marker Machine Inc., 5240 N. 124th St., Milwaukee, Wisc. 53225

Banzai/Racing bodies. Line of 1/8-scale bodies of tough 060 Lexan. Available are Lola T260, CanAm Shadow, BRM P154, Chaparral 2G, Ferrari 612, McLaren Indy M16. $15.95 ea. Banzai, Box 962, Rockford, Ill. 61101

Violett Aero/Mechanical retracts. Aluminum and glass-filled nylon construction, these compact units weigh only [illegible] oz. including servos. All three retracts operate from [illegible] 180-degree servo, 3/16" over-lock in up and down position. Tricycle set, $39.95; [illegible] gear alone, $16.95; [illegible] gear set, $24.95. Violett Aero Modeling Corp., 110 Frederick Ave., Rockville, Md. 20850

Polytex/Heat gun. *Polytherm* is a well-made compact heat gun capable of directing an adjustable air stream of [illegible] than 500 degrees [illegible] almost anything that needs to be dried in a hurry. Invaluable for setting glues, resins, drying dope, shrinking coverings quickly and efficiently. Polished nickel finish, trigger control. $36. Polytex Universal, Box 12, Newfoundland, N.J. 07435

MRC/Spray system. Quality system which [illegible] be surpassed only by complex professional airbrush equipment. Calibrated needle valve controls spray with [illegible] air hose to get in way of work. Spill-proof snap-on covers, all metal parts. *Design Air* uses expendable aerosol cans of 7, 9.5, and 15 oz. For additional data, write Model Rectifier Corp., 2500 Woodbridge Ave., Edison, N.J. 08817

Fox/Eagle 60. Competition-grade engine shown with size C Fox muffler. 14 oz. total weight, 11,500 rpm with 11-8 prop. $49.95. Fox Mfg. Co., 5305 Towson Ave., Ft. Smith, Ark. 72901

Semco/Mufflers. Three basic sizes fit all engine ranges. Directly adaptable to more than 50 engines, including Enya, Fox, Supertigre, Veco, Webra, others. Available in flo-through design for minimum power loss or expansion-type for maximum silencing. Gold-anodyzed finish. $11.95; adapters, $2.98. Semco Model Engineering Co., 113 Graniteville Rd., Chelmsford, Mich. 01824

Rom-Air/Retracts. Pressure-operated system uses freon in handy hand-held charging can. Installed in wing of 1" thickness or less. Lightweight system adds only 7 oz. to aircraft. Positive pressure keeps gear snug in well during flight. $70 for main gear unit, $100 for tricycle system. Rom-Air International, Inc., 924 65th St., Brooklyn, N.Y. 11219

We're Proud Of Our Citizen-Ship

Know the greatest thrills in modeling with Citizen-Ship's high-power, 2, 4 and 6 channel transmitters, racing cars and the Dyna-Jet engine, all scientifically designed by Citizen-Ship.

Citizen-Ship gives you:

- High power transmitter units
- The finest model engineering
- All the newest features that make Citizen-Ship, the models of champions.

Citizen-Ship transmitters, race cars and Dyna-Jet engines available [redacted] at leading hobby stores only.

For information, write:

Citizen-Ship

P. O. Box 297 Westfield, Indiana 46074

Phone: (317) [redacted]

ANNOUNCING THE MODELERS ARE CREATIVE PEOPLE CONTEST

Ever since we introduced Super Monokote a few years ago, we've found that modelers use Super Monokote for a lot of things other than covering their models.

And, some of them have taken the time to write and tell us about their creative efforts with Super Monokote.

FOR INSTANCE

One modeler wrote that he improved the looks of his kitchen 100% by covering the front of his dishwasher and refrigerator with Piper Yellow Super Monokote.

A modeler's wife said her cats always left footprints on the windowsills and all the washing was gradually wearing the paint away... So, she borrowed some of her husband's clear Super Monokote and now just wipes the footprints away with a damp sponge.

Another clever fan said that after he covered his model with Super Monokote, he actually made a bikini for his wife.

Several modelers have created wall designs, paintings and "stained" glass with Super Monokote. One particular artist-modeler did a painting of his TOP FLITE Contender and "Monokoted" the finish on the canvas just as he had done on his model.

Now, we'd like to find out what others are doing with Super Monokote. So, if you've ever used Super Monokote for anything other than putting a beautiful glasslike finish on your model... OR if you have a great idea for something you're *going* to do, tell us about it.

50 PRIZES

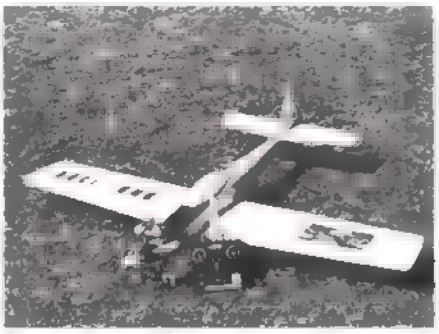
1st PRIZE—12" SONY Portable Color TV
2nd PRIZE—9" SONY Portable Black & White TV
3rd-5th PRIZE—Cassette Tape Recorder
6th-10th PRIZE—25 ft. Roll of Super Monokote
11th-25th PRIZE—Two 6 ft. Rolls of Super Monokote
26th-50th PRIZE—6 ft. Roll of Super Monokote

Entries will be judged by Promotions International, Inc., on the basis of originality. Judges' decisions will be final and winners will be notified by mail. Entries must be postmarked by August 31, 1972 and mailed to:

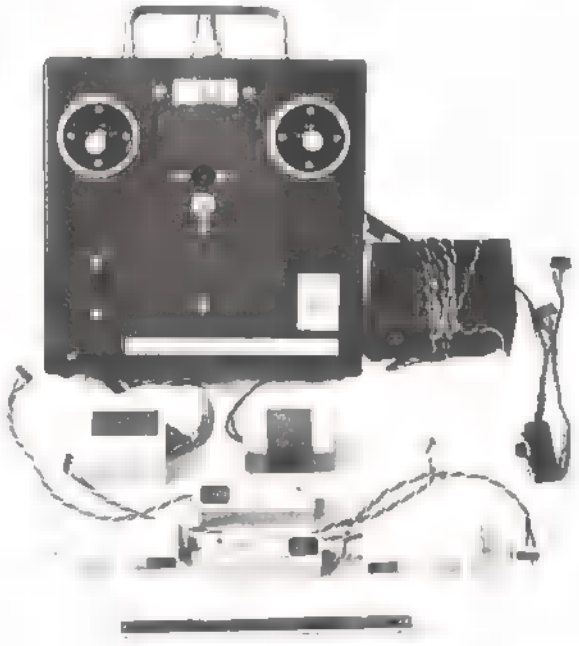
TOP FLITE MODELS, INC., Dept. AM , 2635 S. Wabash Ave., Chicago, Illinois 60616

WORLD ENGINES' BLUE MAX MK. II IC IN THE DOCILE, DELIGHTFUL PILOT FIVE STAR

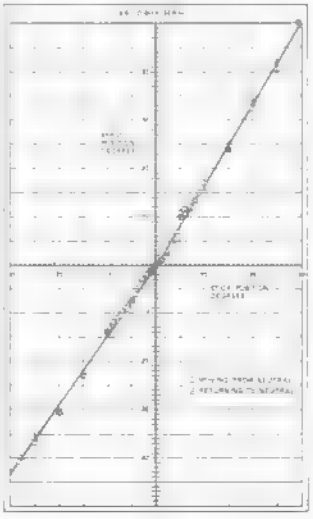
by FRED MARKS with DUANE LUNDALL



The Five Star is one of the easiest to assemble ARF kits we've seen. It doesn't need lots of power. It flies gently, and also does a fairly good pattern.



This complete system includes all NiCad batteries, 12V transmitter, and the nifty new S-6 Low Boy servos. Stick assemblies are real smooth.



Sorry if the title seems a bit of a mouthful! What it probably should read is "The World Engines 1972 System and the Five Star." Why? Because the system tested has only a very slim relationship to the Blue Max systems produced by World Engines in the past. This is a completely new, totally different system.

I can recall World Engine advertisements going back before any of the current family of RC system manufacturers. But not as an RC manufacturer! World Engines, owned and operated by John Maloney, originally was in the business of importing—primarily engines, but also other hobby supplies. During the same era, Jack Port had formed a company called Controlaire which produced, in its earliest days, single-channel RC equipment.

In the early 1960s, Jack and John combined forces and formed a partnership. They continued to produce single-channel equipment (notably the SH-4, SH-5, SH100 and SH112, the "Mule" series of transmitters, and a galloping ghost system) and to introduce a popular reed system. Jack developed one of the earlier digital systems and, although not many were produced, they served as a valuable point in the learning curve.

Port died sometime during 1965 and Maloney became the owner of the firm. He proceeded, with the help of various designers including Don Baisden and Butch Lanterman, to develop the MAN 2-3-4 system, a breakthrough for World Engines. These systems were produced in kit, semi-kit, and ready-to-fly versions and were quite popular, as they were one of the first sets to break the "less than $300" price barrier. I built an airborne pack for use with an existing transmitter and still operate it with four S-4a servos. The S-4a servo featured an IC quad gate used to form the reference pulse generator.

The MAN 2-3-4 was followed by the Blue Max and Blue Max MKI series which were quite similar to the MAN 2-3-4, but with the addition of a decoder which used an IC quad gate per channel for decoding. The S-4 series servo was retained.

During the past year or so, World Engines proceeded to develop a completely new system having a considerably higher standard of performance than the preceding series. This system has been named as indicated in the title. The differences between it and the older systems are basically the following: (a) An IC servo amplifier is used in two new sets of servo mechanics, the S-5 and the LB-6 (Low Boy). (b) The decoder uses a medium-scale integration (MSI) transistor-transistor-logic (TTL) four-bit shift register for decoding, with four more channels achievable by adding a second shift register. (c) A zener voltage regulator has been added to the transmitter encoder. (d) Transmitter output has been increased. (e) A 12V transmitter pack is used. (f) A new receiver design is employed.

Features of the older systems retained include such items as an external transformer isolated charger, buddy box capability, and a convenient handle for carrying the transmitter.

The dimensional and performance data is tabulated for quick review. A description of physical and electronic design follows.

The transmitter tested was on 72.96 MHz. Physically, it was a two-stick, closed gimball unit equipped for a buddy box. The toggle switch visible on the front is for selection of master-slave. Buddy box connection is via a phone-jack socket on the bottom of the transmitter. An RF output indicator arrange-

(Continued on page 94)

CARL GOLDBERG

MODELS THAT ARE REALLY GREAT TO FLY!

SKYLANE 62

Semi-Scale Beauty in a Great Flying Model!

$36.95

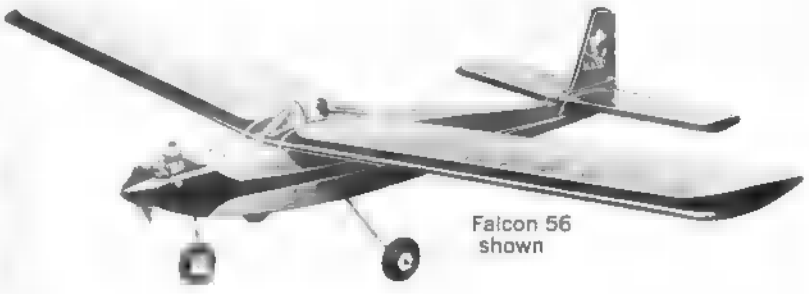
Tough, Roomy Cabin and Front End, For ▮ to 4 Channel Proportional. Steerable Nose Gear. Span 62". Weight 4½ - 5 lbs. . . . For .35 to .45 Engines.

FEATURES:

- See-through cabin, with die-cut plywood cabin sides
- Shaped leading edges plus sheeting
- Cleanly die-cut parts that fit
- Clark Y wing section, hardwood struts
- Steerable nose gear, formed main gear

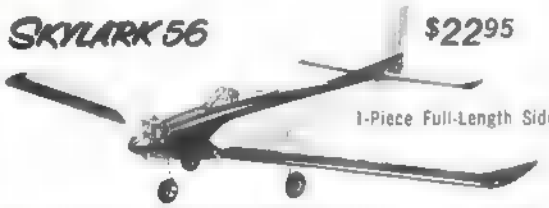
½A SKYLARK

For Single or ▮ Channel, Pulse or Digital. Span 42". Weight 22 oz. For .049 to .10 Engines. - $9.95



Falcon 56 shown

SKYLARK 56 $22.95



1-Piece Full-Length Sides

Now With 1-Piece Full-Length Sides. Takes 2 to 4 Channel Proportional. Span 56". Weight 3½-4½ lbs. For .15-.19-.35 Engines.

FEATURES:

- Semi-symmetrical wing section
- Coil-sprung nose gear . . . formed main gear
- Shaped and notched leading and trailing edges
- Cleanly die-cut ribs, fuse sides, formers, etc.
- New simple "Symmet-TRU" wing construction

JR. SKYLARK

For Single or ▮ Channel, Pulse or Digital. Span 37" Weight 18 oz. For .049 Engines. - $8.95

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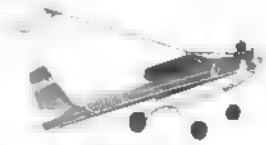

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Development of Chaperoned Free Flight

In January of this year, serious work toward perfecting radio-controlled competition gas FF was begun on several fronts around the country. My first RC FF, the Fortune Hunter, has been flying since late January. It has convincingly demonstrated the feasibility and desirability of controlled gas duration flying.

After traveling 9000 miles last year to fly in FF contests around the country, I realize FF is not dead, as many have claimed. Our numbers seem to be increasing despite the debilitating influence of urban sprawl which takes away flying fields, but it can't last. In the East, free flighters are already hanging on by a thread. Some travel 200 miles just to test fly! Others have resorted to mere altitude contests where the model is not allowed to glide downwind at all, for fear of losing it off the postage-stamp field. New AMA Category II rules also reflect the small field problem.

RC free flight can help the situation. Instead of passively reacting to the loss of flying fields by driving further to find another one, reducing motor runs and flight maxes, building dull short field airplanes, or quitting the sport altogether, free flighters can take positive steps and confront the problem directly.

This is *not* limited RC for dethermalizing or emergency control, as some have proposed for FF in recent years. The work going on now uses RC for full control at all times. The Fortune Hunter, for example, utilizes a two-channel Kraft unit which gives proportional rudder and elevator control, plus dethermalizing when full up command is given. With these functions it is possible to fly the airplane back to the launch site, which is the key point of the whole experiment.

Imagine being able to fly the hottest FF gas job on a field smaller than most RC club fields! Imagine also an airplane which retains the classic excitement and grace of FF yet offers the additional pleasure of controllability in the air.

This text will merely report developments to date and discuss possibilities for future development. Full construction articles on RC FF will follow in the near future.

Initially, ground rules were set up by

FIRST IN A SERIES

RADIO-CONTROLLED COMPETITION FF GAS MODELS ARE A CHALLENGE AND POSSIBLY A NEW EVENT. THERE IS NO MODELING ACTIVITY QUITE LIKE IT!

by DICK MATHIS

AAM Editor Ed Sweeney after consultation with Frank Ehling of AMA who is also working on RC FF. The max would be five minutes with a 15-sec. limit on motor run. The plane would have to land near the original launch point for a flight to be counted. A flight over six minutes would be voided. The motor run would be timer-actuated rather than radio-controlled and a limit of two channels would be imposed on the RC equipment. The airplane would be 15 powered.

Two-channel RC units are now available from several manufacturers for $100 to $120; less in kit form. These units weigh eight to ten oz. for the airborne components and generally combine receiver and servos in one compact package, or brick. They are highly developed and pose no problem for one who has never used radio equipment, which was my case. The same goes for the other RC hardware such as pushrods, connectors, and control horns.

The Fortune Hunter

The idea behind the first ship was that it should be like current contest FFs so it could be trimmed safely without RC to fly on its own. This proved to be wise: the model was saved from destruction by the built-in stability of the design.

However, after getting used to controlling the model, FF trim has been increasingly ignored and the model is now controlled during much of its flight to improve duration.

A typical flight sequence goes like this: set engine run timer, turn on switches and check controls; start engine and check controls again; launch model (throw hard straight up) while helper holds transmitter; take transmitter and feed in up control to steeper climb angle to about 80 degrees, while applying slight rudder corrections to keep model going straight into wind. As your helper counts off seconds 12-13-14, apply gradual left rudder and back off up control to establish a left banking arc for insertion into glide; as motor quits, apply more left rudder and correct stall tendency with down elevator; continue left glide turn until model points into wind. Relax controls and trim for slow glide with elevator trim button (model is trimmed to glide moderately fast and straight without controls).

If lift is encountered, circle in it as long as ship does not get too far downwind; if in bad air, fly away from it in search of better conditions. As five minute max approaches, bring the ship back to launch point with faster glide trim; once it is overhead, circle or do S turns until time to land. To land, make downwind turn and float in upwind. Or, dethermalize model with full up control.

It really sounds quite simple, but it's one thing to describe and another thing to actually do. In 15 seconds this design is a small speck in the sky—it must hit 80 mph at the top. To make the longest possible flight, you have to be very careful not to make mistakes in controls—like stalls, turning too tightly, or gliding too fast. On a perfect still-air flight the Fortune Hunter does nearly five minutes. However, a botched power/glide transition or a few stalls decrease duration significantly, as in pure FF.

Fortune Hunter specifications are as follows: wing area is 600 sq. in.; power is a GMA 15 on high nitro fuel and Rev-Up 7½-3½ propeller; weight is 32 oz. The covering is MonoKote and airfoils are conventional flat-bottomed ten percent thick; CG falls at about 80 percent. The control system is shown in an accompanying illustration. The engine run is regulated by a Tatone pinch-off timer. The fuel tank is a high pressure pen bladder. There are no warps except for ½ in. wash-in (trailing edge down) on the left main wing panel.

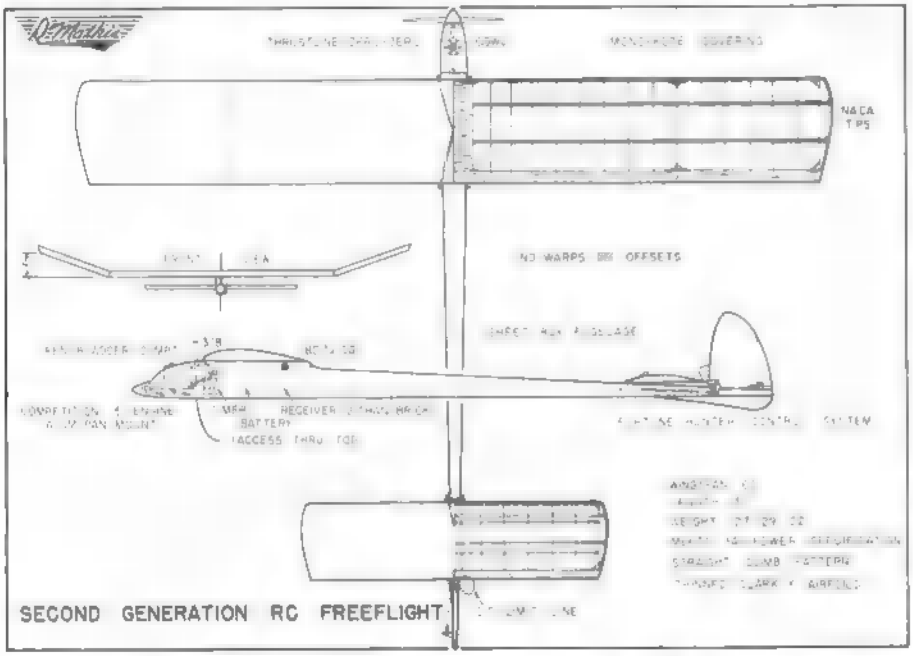
What Next?

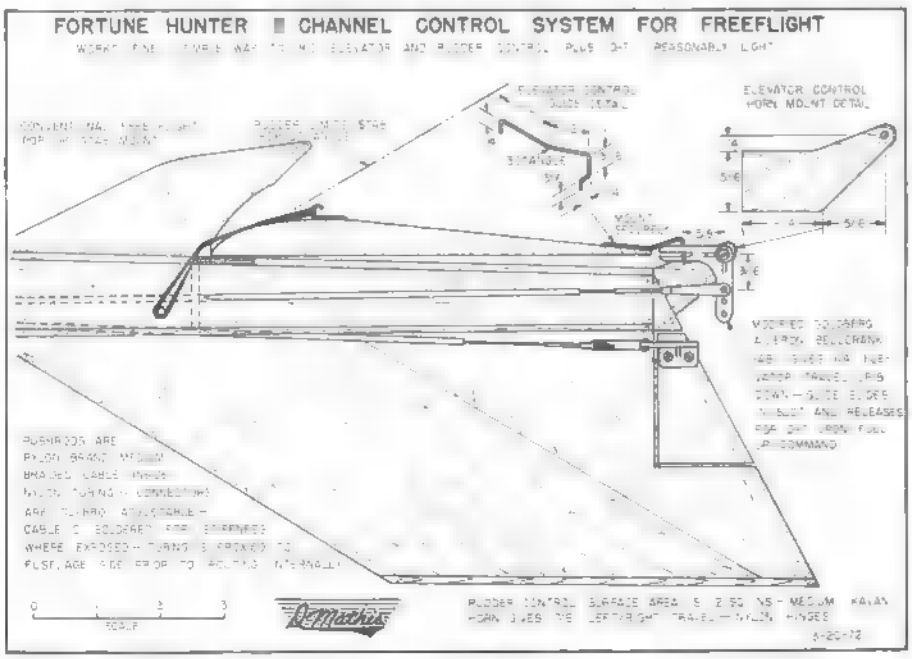
The second generation competition RC FF will probably not be merely a hot FF adopted to RC. Most experts I've talked to think the best future designs will be too unstable to be easily trimmed for FF, due to the need for less dihedral to make control during the climb easier. One of the worst defects of the Fortune Hunter is its tendency to overreact violently to one side when more than slight rudder control is given. Ron St. Jean of California is also working on RC FF and experienced the same problem with his first attempt. He used his famous Wizard 700 with a K&B

Problem of adapting to rudder and elevator control without adding lots of weight was solved simply. It's easy to build, and reliable.

The Fortune Hunter sports a hot GMA 15 motor, Cherny-Van Nest pan, and pen bladder pressure fuel system. Hatch covers RC compartment. Switches for on/off and frequency

The author traveled over 9000 miles to FF contests in 1971, and considers himself a FFer even with RC gear in his ship. Wife Mary-Kay operates starter.





greenhead 19. It was modified with a larger rudder and larger fuselage and slightly less dihedral, but it still was almost uncontrollable under power due to excessive pendulum effect of the high pylon combined with normal dihedral. Adding rudder area did not help, according to Ron, so he removed more dihedral.

I also added about 30 percent more rudder area after initial flights, but I have not experienced extreme difficulty because the Fortune Hunter's pylon is rather low and the high thrust line design inherently flies a groovier pattern. Future designs will reflect the need for less built-in stability—they will probably be shoulder-winged with low dihedral, as shown in the drawing.

Another problem is wind penetration. Both Ron's ship and my own are fairly large for their weight and are limited in their ability to make progress against strong winds, which is necessary in order to range far from the launch point in search of thermals. Future designs will thus be smaller and more streamlined.

The drawing of the Fortune Hunter control system shows how dethermalizing capability is incorporated. While it may not be necessary in the future, it is nice to have the dethermalizer when an emergency situation occurs and have the ship correct itself and float safely to the ground. In this regard, a safety catch on the transmitter is a good idea to prevent the dethermalizer from being actuated accidentally.

It is obvious that this type of model will appeal to many sport fliers who now enjoy RC glider soaring, but it is also inevitable that competition-minded types will seek the ultimate in performance. There will probably be several distinct trends in this regard, depending on what the AMA does with rules and which manufacturers and designers get a head start.

One exciting prospect for free flighters is that RC FF will interest the RC manufacturers. This will mean more FF hardware, engines and research,

(Continued on page 92)

EAA CLAMBAKE

by MONTY GROVES

WHILE MANY HOMEBUILTS ARE AKIN TO OVER-SIZE MODEL AIRPLANES, OSHKOSH ALSO HAD ANTIQUES, WAR BIRDS, AND SENTIMENTAL FAVORITES. THIS YEAR THE DATES ARE JULY 30 TO AUGUST 5th.

Most "annual" air shows, while achieving a distinctive and historical charisma all their own, fail, for one reason or another, within a few years. Usually due to the "lack of"—lack of financing, lack of space. But mostly for lack of interest.

Yet, for the *19th time* the Experimental Aircraft Association organized an even bigger and better "annual" than the year before. It's downright difficult to write about their 1971 Annual Fly-in Convention without using every superlative in the book. The sky was blue. The weather was great. The people were friendly. And the airplanes? Simply spectacular, beautiful, incredible, super!

Following hard on the heels of the Nats in Chicago, the EAA meet took place just up the road at Oshkosh, Wisconsin, with the concurrently running EAA-IAC Aerobatic Contest taking place in nearby Fond du Lac. At Oshkosh, the kind and quality of show planes, and the manner in which they were displayed made it well worth the trip. There were over 800 airplanes on static display—antique, classic, WWII, home-built and "special" varieties from which to choose.

It's a sure bet that in 99-44/100% of the cameras, there was at least one frame of "The Winnie Mae," Dave Jameson's beautifully restored Lockheed Vega. Although suffering a terrifying engine fire three months before, quick action by Dave and the mechanics kept it from becoming a tragedy; the boys had her all fixed and gussied up by show time. Seeing her fly by with the sun glistening off her blue and white wing as she turned into a sharp climbing right clearly demonstrates why the wooden Lockheeds symbolize the Golden Age of Aviation.

For the scale modeler, the opportunity to photograph and visually inspect a prospective model from stem to stern will certainly make the winter building season more rewarding. And, if your airplane is bigger than the proverbial breadbox or even if it's still rummaging around in the corners of your mind, the EAA fly-in has something for you.

Each day's activities included workshops giving technical instruction and often a chance to "do it yourself" on such crafts as torch welding aluminum, aircraft coverings, construction of tube fuselages and how to work sheet metal. Various manufacturers' reps were in attendance and holding how-to sessions on Franklin engine assembly, constructing an Emeraude spar, a BD-4 wing. . . .

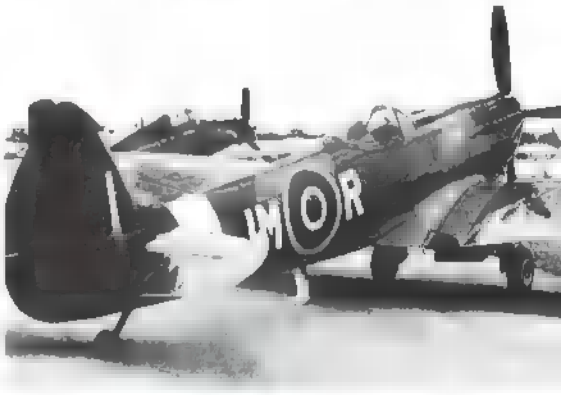
From 9 a.m. to 5 p.m. each day, EAA-sponsored forums covered a wide range of interesting as well as need-to-know subjects from amateur aerial photography to a discussion by a government official on wooden aircraft design and inspection. All these aids, to the EAA, add up to one thing: stay alive.

Signalled by the traditional boom of an aerial mortar, the show opened with a fly-by of the Warbirds. This was followed by the aerial gymnastics of the likes of Art Scholl, the Cole Brothers and the Flying Pierces. Learning to spell "Lomcovak" is almost as spectacular as seeing Art Scholl do one. The thrills in the skies at Oshkosh 1971 were no less than those over Dominguez Field 1910. Beachey lives! (Today, he's smarter.)

EAA is a place where you can take your mother. With the amount of people passing through the gates each day, you'd think there would have been real problems. But there didn't appear to be any. People were polite and courteous—perhaps encouraged by the hordes of EAA volunteers who kept the grounds in absolutely meticulous condition. Their continuous clean-up operations obviously encouraged visitors to be neat themselves.

It's immediately apparent that the EAA and the folks at Oshkosh put considerable thought, cooperation and effort into the planning of these events. With Wittman Field's normal 2500 daily flight operations—just for one example—swelling to over 42,000 during EAA week, the fact that no serious mishap occured is a tribute to everyone even remotely involved.

Plans are fully under way for this year's meeting July 30th to August 5th. Trailer/camping, hotel and motel facilities are available in the area. And for those non-aviation oriented, Oshkosh is situated on the shores of Lake Winnebago. It's a natural summer resort with plenty other recreational possibilities. Area restaurants and cafes offer fine food at inexpensive prices. If you carry your "house" around with you, grocery and gasoline prices are cheaper than, or comparable to, California expenses.



WOULDN'T THIS BE A GREAT PLACE FOR THE 1973 AMA NATS?

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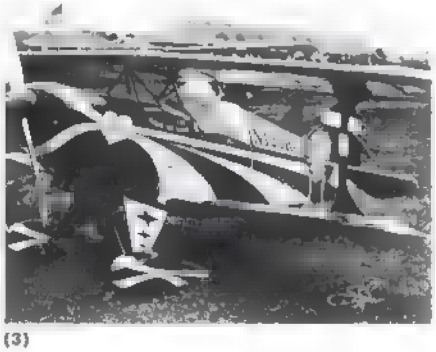

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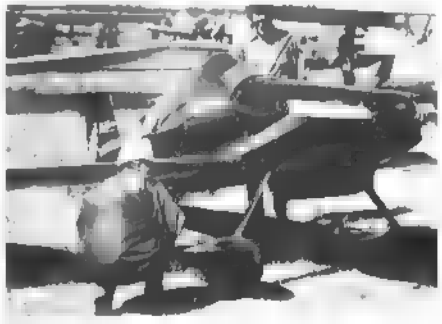

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(1) It's the tail art that makes the Messersnipe by Gil Hallquist so dear to AAM. Plane named "Dirty Bird Two" and replaced similar ship built before WW II, also a homebuilt. (2) The "Duce" is just a nice two-pilot carrying parasol. Smooth lines throughout. (3) Every EAA event of any size has a Pitts "Special." This year there were 37 of 'em. (4) Here's the 2/3-size Mustang. Uses 200 hp Ranger in-line engine. Plans available from Sturgeon Air Ltd., Edmonton, Alberta, Canada. Flies and sounds like a P-51. (5) Twin 25 hp snowmobile engines push the Harris Wood's Aerosport Rail out of the flight line. (6) Clean, swift lines and symmetrical airfoil on the Stephens Akro recommend it for modeling. Three-views and story are coming in AAM. (7) The story of the original Falck "Rivets" was in the February issue. Here is John Steichen's "Bondo" which combines the "Rivets" fuselage/tail with "Shoestring" wing. It is fast and stable. (8) Volksplane is a big model airplane. Not many instruments are needed, and there

Photos by Monty Groves

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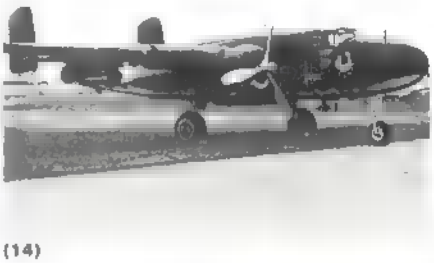

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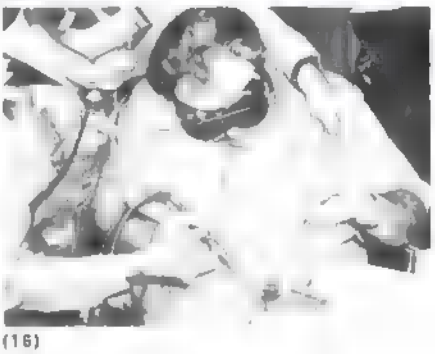
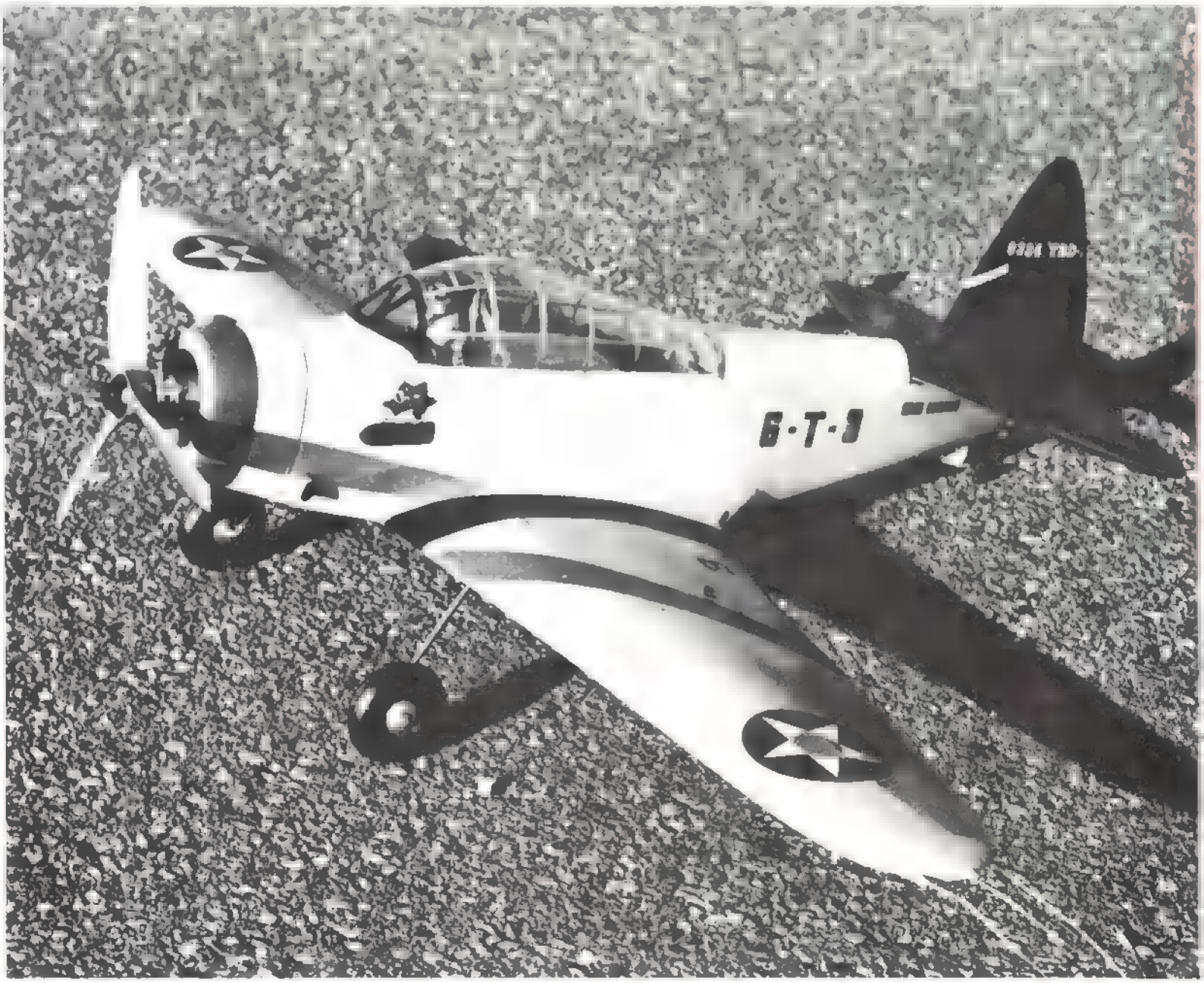


(16)

is not much room for any more than shown. Note air horn! (9) Last remaining Grumman F3F2 restored by Gene Chase. Gear retraction by muscle power. (10) National meeting of Mooney "Mite" owners held at Oshkosh. Distinctive and always attractive. (11) Originally built by Columbia under license from Grumman, this is the last flying J2F6 "Duck." Even has simulated bombs aboard. (12) RADIO-CONTROLLED! Well, it was supposed to be. It is converted from drone configuration 1943-44 PQ-14B Culver designed by Mooney. (13) This Fairchild trainer has nice lines. Hardly looks like a military design with that bright civilian paint job. (14) Military paint job — this S-25 looks quite menacing and serious. A great flying machine. (15) Standard J-1 took ten days to fly to Oshkosh from Tucson, Arizona. Charles Klessig probably enjoyed every moment. (16) Workshops on welding, woodwork, and engine overhall were continuously held by volunteer instructors. "Learn by doing" method used.

Douglas Devastator

by ROLAND BALTES



TIRED OF GUARDIANS? THIS EARLY NAVY TORPEDO BOMBER MAKES A VERY CAPABLE AND COLORFUL CLASS I CARRIER JOB.

The Torpedo Bomber Douglas (TBD) when introduced into active Navy service in 1937 was considered the world's finest torpedo bomber. Given the name "Devastator," it was revolutionary when compared to its biplane predecessors. By the time World War II broke out, however, it was hopelessly obsolete and outclassed.

Over 130 were built during the era of highly colorful Navy marking schemes. This is what attracted me to select it for my next Class I Carrier model. I just could not resist the gray fuselage, yellow wings, and various colored tail surfaces, nose and fuselage bands that would make the model extremely colorful. A refreshing change to the dark blue models you normally see at Carrier contests. In addition, the Devastator qualifies for the 100 bonus points given to a scale model of a prototype airplane without question. Having flown in Carrier events for over eight years, I knew the value of having a reliable, sturdy and simple model. It was designed to build quickly and be repairable when necessary. Most of us find out sooner or later that balsa models are not indestructible. This I proved at the 1971 NATS when I hit ▬ of the arresting wire eye bolts during a landing attempt which broke off the wing. The rebuilding job also gave me the opportunity to try another color scheme on the Devastator—light blue/gray top surfaces and gray bottom ▬ used during early WW II. Further information on the Devastator can be found in Profile Publication No. 171 which should be available at most well-equipped hobby shops.

The model was designed to use ▮ 40 engine. Mine is powered by ▮ K&B 40 rear rotary with a bolt-on exhaust slide throttle, running on pressure with a fuel metering system. Best score achieved so far was 540 points with a 105 mph high speed and 27 mph low. For those of you new to the Carrier event I suggest you stick with a stock RC 40 engine in the beginning because of the reliability this kind of engine offers. Most local contests are won by reliable engine/airplane combinations. Keep in mind that you need a complete flight in Carrier, consisting of seven laps high speed, seven laps low speed, and ▮ 100 point landing to get a good score. High speed alone will not do it, although the scoring system favors it. If you think you are ready to challenge the record-holders let me just mention the type of equipment needed.

A good hot 40 is the basis to start with; if you can get it hopped up by someone that knows what he is doing it will help. Since max rpm is needed, forget about a venturi throttle unless it's especially made or bored out for unrestricted engine breathing. An exhaust throttle, whether it is a slide, wiper, rotating barrel, etc., is most commonly used. It must close sufficiently and be adjustable to allow setting the engine idle low enough for consistent slow speed flight (at least 25 to 28 mph on a calm day). A pressure fuel system is practically a must to get max power and consistent engine runs. This then dictates using ▮ fuel metering system during idle. Unfortunately, most of these items are not readily available at the hobby shops. I have seen the old type Supertigre strap-on exhaust throttles used quite successfully, the hole in the baffle may have to be made smaller to get low idle. The Perry carburetors are also becoming popular especially since they incorporate a fuel metering system. Needless to say, a lot of experimenting will be required until the whole combination works consistently. To make your own exhaust throttle/fuel control system see Harry Higley's article in March 1972 AAM.

Construction

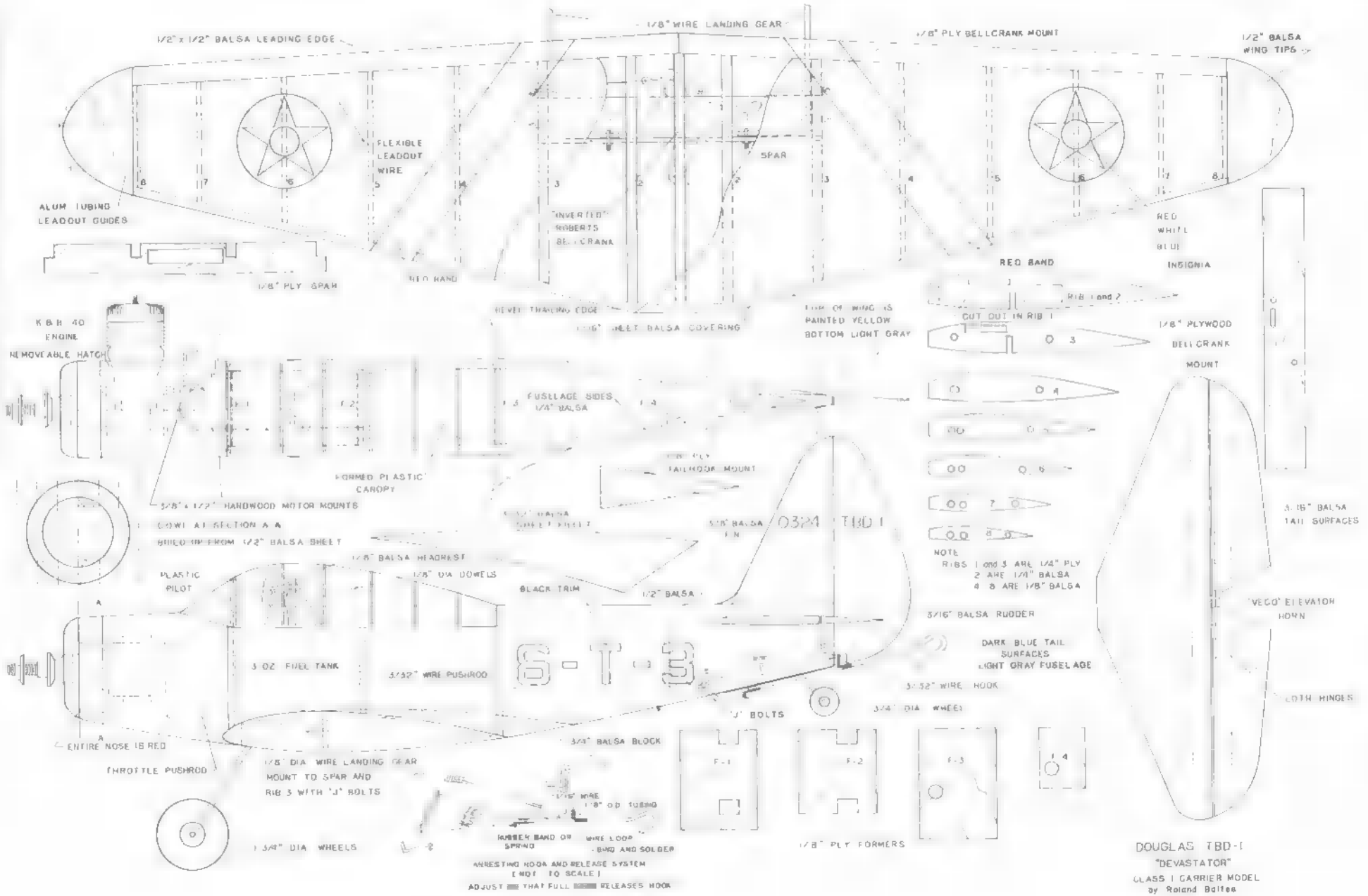
Before you start construction, decide on what engine to use since motor mount spacing may have to be changed and location of throttle pushrod from the bellcrank has to be accounted for early in the construction. Fuselage sides need to be cut out first from a sheet of 1/4" balsa. The sides start at former 1 and follow the shape of the wing to former 3. Next cut out the plywood formers 1 thru 4, epoxy former 1 to the fuselage sides and epoxy the sides together at the rear. Careful attention to fuselage alignment is important at this stage. Formers 2 and 3 should be used to maintain the shape of the sides but not glued in yet. Cut hardwood motor mounts to shape required, drill necessary holes in former 1 for fuel lines from tank, then epoxy tank, motor mounts, and former 2 into the fuselage. Position of former 2 is not critical and may be located to account for the size of tank you are using. For this reason the motor mounts as shown on the plans are longer than needed. It is important, however, to keep the mounts parallel to the top of the fuselage sides. Formers 3 and 4 can also be installed at this time.

The wing should be tackled next. Cut out spar, bellcrank mount, ribs and leading edges. Epoxy the bellcrank mount to ribs 1, 2 and 3; then add the spar. Careful alignment is needed here to insure proper dihedral and preclude building in any twist. When dry, bend and install landing gear using "J" bolts. Now glue on the leading edges; when dry, position and glue the remaining ribs in place. Temporarily pin a piece of balsa along the trailing edges of the ribs to keep them aligned. While this is drying, cut down the throttle bellcrank to the shape shown on the plans, hook up leadouts to it and install on the mount. Run the leadouts through the wing ribs if you remembered to cut the holes—if not, now is the time to do it.

Next, plank the top of the wing with 1/16" balsa sheet. Before planking the bottom of the wing, trial fit it to the fuselage, temporarily install the engine, then determine location and routing of the throttle pushrod. Holes will need to be cut in former 1 and the top wing sheeting to accommodate it. Install the pushrod to the bellcrank and then plank the bottom of the wing with 1/16" balsa sheet. Next add the 1/2" balsa wing tips, and when dry, shape the tips and round off the leading edge of the wing using medium sandpaper.

(Continued on page 89)

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84



jet set modeler

FLYING TO A MEET WITH YOUR MODEL IS EASY IF YOU KNOW HOW TO HANDLE THE PROBLEM OF CARRYING IT ALONG SAFELY AND INEXPENSIVELY.

by DON GUTRIDGE from the Friendly Skies of United

Extra care is given packages such ■ model plane boxes. Here, the control-line model boards a 747.

It was more than a year ago when I was first struck with the idea of special handling for our models on United Air Lines. In recent months that idea has exploded into what amounts to a second job, and is taking up nearly all my free time. It yields no monetary gain, but it was not intended to—it has, however, given me a great deal of satisfaction knowing I am doing something worthwhile for modeling, and the friends I have gained shall remain priceless. The program would not have gotten off to such ■ rousing start without the truly dedicated help of so many people within our great hobby and at United. They are just too numerous to mention here, but I would like them all to know that their help is greatly appreciated, and we may now go on to bigger and better things.

Building a box for your airplane and flying to a contest is really fun, even if you ■ a novice flier. I chose the Nationals so I could see our nation's best in action. It is my intention to relate my experiences to you strictly as a novice pattern flier, so you may judge for yourself how much fun it can be to make like a *Jet Set Modeler*.

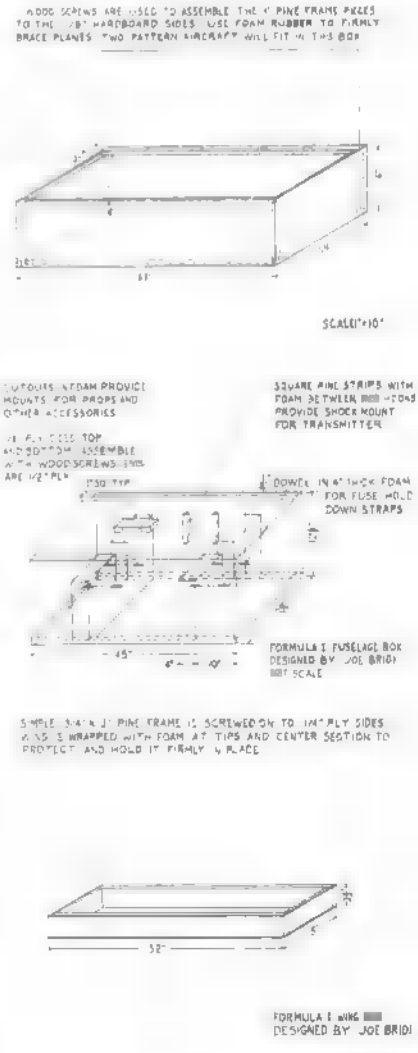
Since logic dictates that we take first things first, let us begin by producing a container for the airplanes to travel in. The primary factors to consider while preparing our box are: strength, lightness and compact size. All of these may be incorporated into a container which will give many years of service. The task of building a box is much easier than you might imagine. Mine took only two evenings, and about $9 from the budget.

After measuring the largest of the two planes to be carried, two in. were added to each measurement to allow for padding, and another two to the height to provide for positioning of two fuselages on top of the wings. One large sheet of 1/8" hardboard was cut to size at the lumber yard, and several strips of 1 sq. in. pine were purchased to frame and brace the inside of the box. In addition to the wood, you will need a box of wood screws, ■ handle, four hinges, three latches—one with ■ lock and two without.

The easiest way to assemble the box is to first cut the frame pieces to size and clamp them to the side boards for drilling. This way you can drill through the sides and the frame pieces, and then insert the screws—all in one operation. To mate the sides and ends together simply hold in place, drill a hole, and add ■ screw at each end. The remaining holes and screws may then be added. When all but the top is assembled, add the hinges and latches, and finish it off with a handle. Remember here that you will need to back up the thin sides with sections of pine to give ■ solid mounting for all of the hardware.

To brace and protect the planes, my box was lined with 1 in. foam rubber; additional sheets of foam were placed between each wing and fuselage. At first I was at a loss in deciding what to do with the empty space that remained between the planes and the top. It finally dawned on ■ that it could be made, literally, a "super suitcase." So I proceeded to fill the empty space with some clothes, a few spare plane parts, and my bedding for staying at Glenview NAS. I even stuffed in a chair to ease the tension of a week on my feet. It was worth it!

(Continued on page 79)



the second

by PATRICIA T. GROVES

coming

SPECIAL-PURPOSE HIGH-ALTITUDE AIRCRAFT NOW FLYING IN NASA-SPONSORED EARTH RESOURCES AIRCRAFT PROJECT. "AT ALTITUDE, GOING AS FAST AS IT'LL GO, IS JUST ABOUT AS SLOW AS IT'LL GO."

NASA File Photo

Standing within a hundred feet of a Pratt & Whitney J-75 going full-bore is a thrill you really can afford to miss. But mounted inside a Lockheed U-2 that's about to STOL in its own inimitable fashion, who cares about a busted eardrum? Short field performance? You betchum, Red Rider. Departing at 10,000 feet-the-first-minute, U-2s don't encourage long "good-byes," and U-2 pilot Bob Ericson on his way to work is—out of sight.

Since being mustered out of the Air Force in April 1971, two Lockheed U-2Cs, decked out in brand-new civies, have been flying out of Moffett Field (Mountain View) California. On "permanent temporary loan" to NASA's Ames Research Center, the U-2s, now designated N708NA and N709NA, carry out a variety of scientific experiments. Complimenting three other NASA aircraft based in Houston, Texas—a Lockheed P3A Orion, a Lockheed C-130B Hercules and ■ Convair RB-57F—the NASA-Ames aircraft were introduced into an already existing Earth Resources Aircraft Project. In preparation for the future Earth Resources Technology Satellite, the U-2s augment the high altitude capabilities that were needed.

Engaged in the remote sensing of data, all the NASA aircraft are contributing towards establishing a basis of experience in data collection, interpretation, cataloguing and dissemination before the ERTs satellite becomes operational.

By simulating the satellite's eighteen-day cyclical coverage, the U-2s fly over five control areas chosen for their particular ecological idiosyncrasies. Because of the unique situations each test site presents, the areas covered are: the entire Chesapeake Bay region of the eastern U.S.; a 25,950 sq. mi. section around Phoenix/Tucson, Arizona; and (because of the proximity and diversity it offers) California's northern coast to Lake Tahoe, Nevada; the San Francisco Bay Area and California's prolific agricultural Central Valley region including the entire Los Angeles Basin. Data gained from the flights is available free to requesting federal, state and local agencies.

Since we on the ground often can't "see the forest for the trees," high-altitude photography in this instance functions as a learning tool for scientists to study and promote the general health and well-being of the Earth. Somewhat like the Intensive Care Unit of your local hospital, the current physiological status of the "patient" is systematically monitored and the results studied by various specialists. Ideally, for example,

NASA File Photo

Every view of this unique plane suggests a big glider. As it flies [illegible] 45,000 ft., it needs lots of wing [illegible] tail areas.

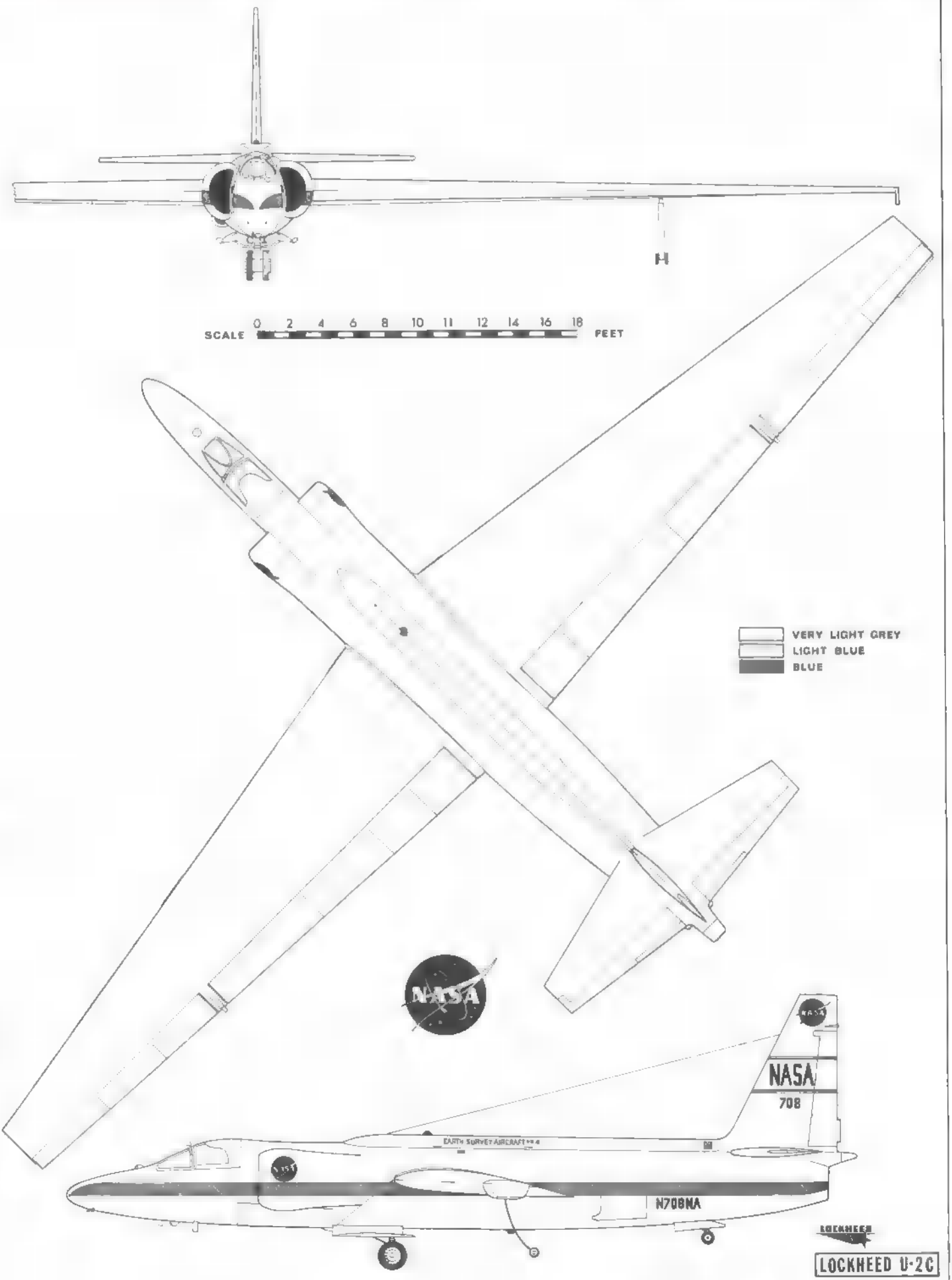
Rear-view details show tail surfaces fairings, air brakes [illegible] tail pipe clearly for the scale builder. Photo by Miller.

should the patient be threatened by an encroaching attack of corn blight through its mid(west)section, the Department of Agriculture can immediately notify farmers in the infected area.

It's precisely this sense of immediate purpose and the possibilities of future good that's noticeable in all the operations crew at NASA-Ames. Shortly after the April 2, 1971 budgetary approval was given the NASA-Ames portion of the project, the flight operations crew became more than mere ciphers on a piece of paper.

In Plant 42 at Lockheed's Palmdale, California facility, the Lockheed mechanics permanently assigned to the two fifteen-year-old "vets," began the rejuvenation. Meanwhile, up at Moffett Field, NASA Project Manager Marty Knutson gathered together the necessary ground handling and data facility personnel and equipment. By June 3, when the "08" and "09" flew into

(Continued on page 90)


SCALE 0 2 4 6 8 10 11 12 14 16 18 FEET
VERY LIGHT GREY
LIGHT BLUE
BLUE
NASA
708
N708NA
LOCKHEED U-2C

Wizrod350

WHEN YOU COMBINE THE BEST OF A WIZARD AND A RAMROD, HERE'S WHAT YOU GET—AN UNCOMPLICATED HIGH-PERFORMANCE FF POWER DESIGN.

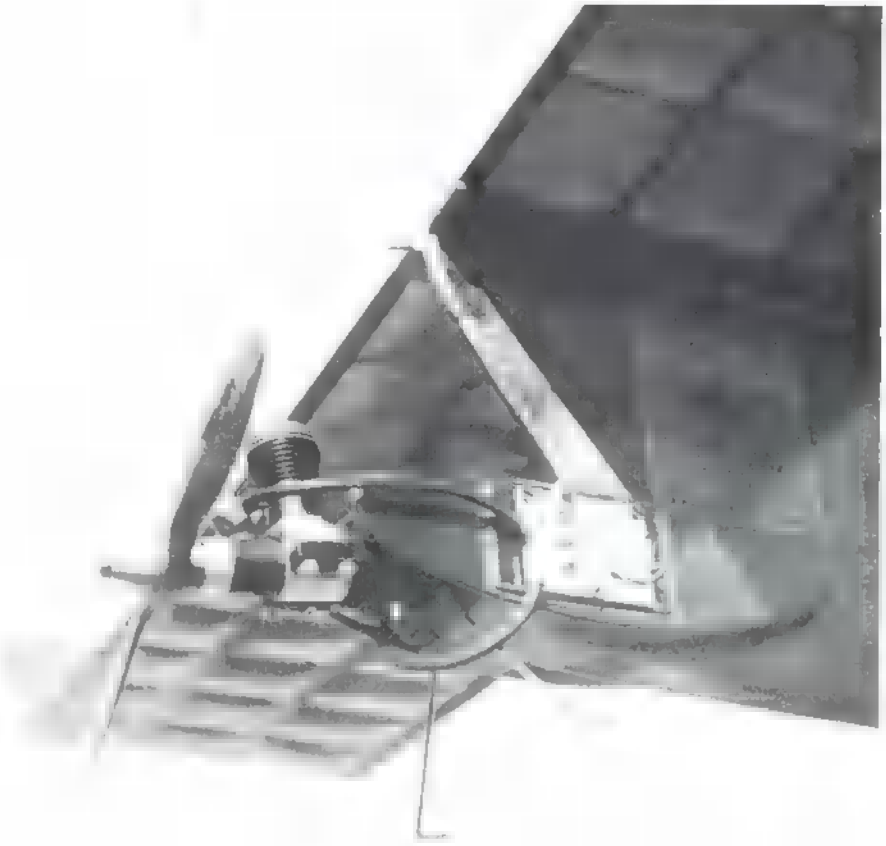
by RON ST. JEAN

As its name implies, the Wizrod is a combination of the best of two other models designed by the author several years ago, the Wizard and the Ramrod. Of the two models, the Ramrod was the easiest to trim out and the most forgiving when mistakes were made, although both were exceptionally easy to fly compared to other designs available. So in making the combination, we started with the Ramrod configuration as a basis.

The Wizard had such a long fuselage that it reminded one of a gangly teenage boy. Because of this long fuselage, the Wizards tended to flex when in flight, the tail sometimes appearing to wobble from side to side as the fuselage twisted. Actually, this characteristic did not harm the flight pattern, but probably did spook away a few potential Wizard builders. Another unwanted characteristic of the Wizard was its occasional tendency to tail slide. If you ever saw one come half way down from shut-off—tail first—before completing the stall, you'd remember it. But don't let us sell the Wizard short. Its great contest potential is perhaps best attested to by Lee Polansky's phenomenal Class A Open record of 94:19! And this was done with the ½A version with an 051 engine, breaking his own previous Class A record of some 70 minutes set with the same model.

Despite the innumerable trophies that the Ramrod brought home for its owners over the years, it was not quite perfect either. The wing airfoil was not optimal, and every once in a while a Ramrod would zero out, normally coming straight in under power at a very high speed. It was finally discovered that this tendency to zero out was due to the wing's center of pressure being slightly behind the lateral twisting line of the wing. Thus, under conditions of high loading, a twist in the wing was introduced which was similar to adding negative incidence. Needless to say, if any Ramrod, and especially a hot one, were tail heavy and thus short on incidence to begin with, it would be dangerous to fly, as just a little negative wing twisting could spell disaster.

This phenomenon of wing twisting was best demonstrated on a Ramrod 600 several years ago. We had been flying this particular 600, which was rather heavy, with a 29 engine for some time, with no complaints. Just for fun one day, we substituted a hopped-up 35 for the so-so 29. The first flight, with the 35 running at a fast four-cycle, was quite normal with an average nose-up-under-power tendency. But when this hot 35 was leaned out on the second flight, a most amazing thing happened: the 600, which had been launched straight up, climbed to perhaps 150 feet, slowly nosed over into a dive, came



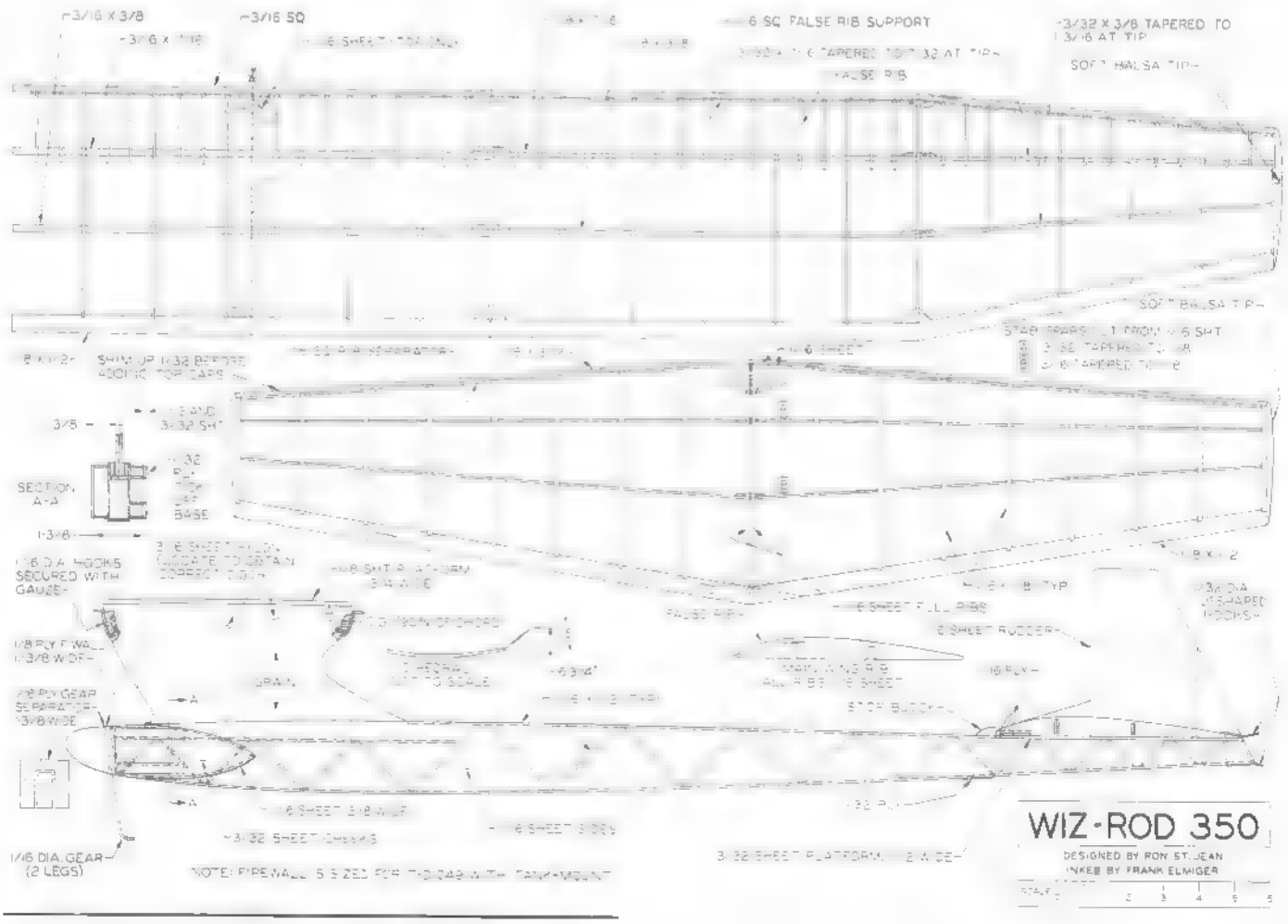
straight down, and pulled out upside down! It had done an outside loop! Continuing its inverted climb at about a 20-degree angle, the Ramrod started a slow roll, which was nearly completed when the engine shut off, the model gliding in normally, just as if nothing had happened! Shades of Eddie Rickenbacker—we had almost done an inverted Immelmann with a free-flight gas model! Visibly shaking from what we had just witnessed, we resolved never to fly that model again, so once we were home, it went up into the attic.

High-revving Tee Dee 049 swinging a RevUP 633 prop pulls Wizrod way up. Cox tank mount is used.

Another example, this one illustrating a positive use of the phenomenon described, is Lee Hines' Sweepette hand-launched glider design. Lee discovered that his gliders performed better with a highly swept-back wing, probably because they were getting higher on launch. In effect, he had a variable-incidence glider. That is, the center of pressure was well behind the lateral bending line of the wing, the incidence coming out during the launch burst, but returning for glide stability.

But back to the Wizrod: The first departure from the Ramrod design was to utilize the Wizard tapered wing-tip configuration to eliminate the old ten-

(Continued on page 70)



FULL-SIZE PLANS AVAILABLE—SEE PAGE 84

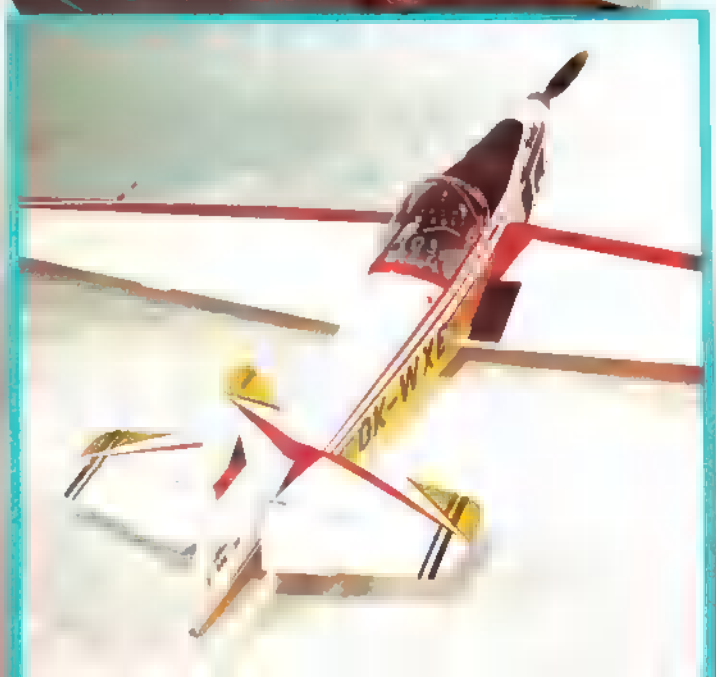
To brush...or not to brush

Here is the answer—Ask Don Botteron if you can brush Hobbypoxy. His answer is a nice collection of scale "wins." And Don gets the points because his Hobbypoxy-brushed Zlin beats the boys both on the ground (racking up those big scale finish points) and in the air. Hobbypoxy brushes smoothly as any other finish you can find, and better than most. Because we designed it that way. And the results shine.

Builder: Don Botteron; Fort Collins, Colorado. No, he didn't really use that big brush on the model, but he gets big results. It's the paint that counts, not the brush!

Plane: Zlin "Akrobat"

Finish: Brushed HOBBYPOXY



Hobbypoxy...

the epoxy finish
you can brush or spray!

HOBBYPOXY PRODUCTS

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ON THE SCENE

scale at eastern championships

SCALE WAS ONE OF THE BIGGEST EVENTS AT LAST YEAR'S MEET. MANY FLIERS USED THEIR STAND-OFF MODELS IN PATTERN TOO.

The Central Jersey RC Club held its Annual 1971 Eastern States RC Championships on Sunday, Oct. 3. For the four Sundays prior to and after this date it rained. After a meeting between the man upstairs and Leon Shulman, CD, it was agreed to have winds instead of rain that day. In the early morning, there was considerable fog with slight clearing by 9 am. Several trial flights were made by brave contestants who were given the option of aborting the flight with no penalty if they weren't satisfied with the weather and visibility. It had cleared sufficiently when official flying started.

There was a tremendous turnout with several hundred fliers and even more spectators. Contestants came from the New England area, Pennsylvania, Delaware, Virginia, Maryland, upstate New Jersey and New York. Total number of contestants was 94 who flew in one or more of the five events. It is interesting to note that Class A had the largest number of entries, with Scale following. The breakdown of contestants who flew in each event was: Class A—39; Scale—19; Class C/Exp.—13; Class B—12; Class C/Nov.—11.

The Shulman System of contest management was used, which eliminated all confusion and accounted for the high number of flights in this meet. The Pattern fliers flew three rounds and Scale had two flights. The Scale judges, headed by Bill Semonovick, were complimented by the contestants on their scoring. Results differed only a few points between these CJRC Club judges and the Nationals judges on four of the Scale model planes that entered both these meets. Although the Scale judging was excellent, because of the high winds and occasional gusts, some fliers did not risk flying their models. The winner of the Scale event was Harold Bronstein with his COIN twin-engine powered model. Several fliers entered Top Flite P-51 Mustang (Stand-off) Scale models and flew in both the Pattern and Scale events, all with operating flaps and some with retractable gears. With the high number of Scale entrants, it appears that a trend is developing for Semi-Scale and Stand-off Scale models. Even in the Pattern events there were many scale-like designs, complete with markings, details, etc.

Prizes were awarded to every entrant who flew. There were a total of 237 flights attempted or made until 4:20 p.m., when all rounds were completed. First place winners were as follows: Class A, R. Tyson; Class B, E. Clement; Class C/N, M. Atun; Class C/E, J. Martin; Scale, H. Bronstein.

An amusing highlight of the meet took place before the awarding of prizes: one of the contestants had lost a servo from his wing-away in the grass area. About 50 other fliers formed a line and walked through the field. They found the missing servo—also two spinners, a prop nut, one good propeller and a wheel.

Many prizes were awarded, with trophies going to 15th place, plus several merchandise awards—engines, kits, props, fuel tanks, etc. Several created much amusement: Tony Bonetti won a trophy (which *he* donated, so we had to switch this for another of a Heathkit Servo Simulator (Tony repairs Kraft units, so we switched this for another of comparable value); Ernie Weiss won a trophy and a J&J Eyeball kit (which he manufactures); Dick Sarpolus won a trophy and a J&J American Eagle Sailplane kit (which he designed).

Of course, there were several Special Awards made. A brand-new Super Maple Prop went to Morris Atun (since he had a perfect score for breaking his prop on each flight that day—we broke it as we were making the award). A "dirty towel award" was presented to Harold Goldclank (to replace the one he always hangs from his pocket while he flies).

by LEON SHULMAN

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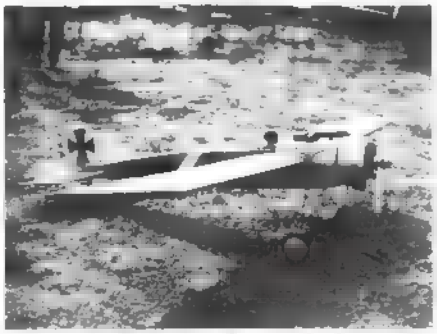
(2)

(3)

(4)



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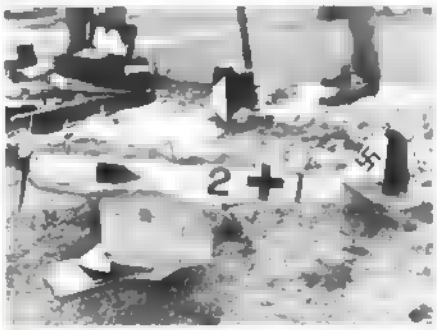

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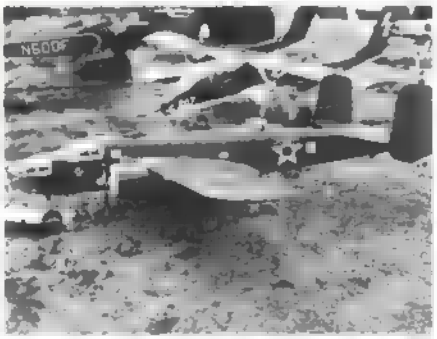

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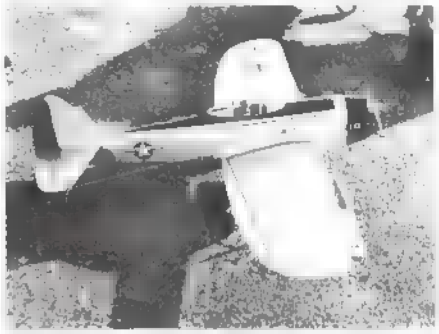

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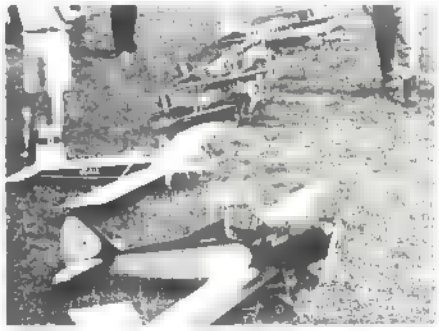


(11)

(1) Close-up Harold Bronstein's "Coinfighter." Won Scale event with smooth flying in rough air. (2) Quite a variety of planes were displayed, many elected not to fly because of the wind. (3) This pair of T.F. kit Mustangs were flown in both Scale and Pattern. Model in foreground by Phil Cushman has Romair retracts, flaps, etc. Great flyer. (4) The Art Chester Racer known as "Jeep" flown by Walt Sousa. (5) A Fokker Eindecker—always a favorite and good performer. (6) F.W. 90 by E. Baltera appears to be a stand-off scale type with good Pattern potential. (7) The Big [redacted] from a Royal Kit by S. Charlton. (8) From Nick Ziroli's plans—a P-47 "Jug." (9) The big Fokker D7 from Sterling kit built and finished to look war weary. Very effective detailing. (10) Josh Titus' intricately detailed [redacted] Ansaldo fighter scout plane. Even has scale functional exhaust stack. (11) Front to back: Fly Baby, Volksplane, two Nieuports, and Taylorcraft. These on static display during Pattern flying.

Photos by Rich Plavnicky, J & L Snyder, Arthur Thoms, and John Potenza

Quikie MK'4

THIS CLASS B PATTERN DESIGN IS A FINE SPORT FLYER FOR WEEKEND ., FAST BUILDING, GENTLE IN FLIGHT, DURABLE, USES A 60.

by DON SOBBE

Three years ago I got tired of fixing something every time I came home from the flying field and decided to do something about it. Not having much time to build or repair, the Quikie was designed around my requirements for a fast, maneuverable, rugged sport ship that could take the kind of punishment the average flier dishes out. It was a success—then the contest bug bit. Wanting to retain the prototype's durability, a series of modifications were made to improve performance and handling, resulting in the MK 4.

With a 51 or 56 in the nose, the Quikie has very pleasant handling characteristics. Put a healthy 60 up front and this ship will hold its own in any B Pattern and most C Novice contests. Six trophies in two seasons bear this out.

There are three structural features in the fuselage which need clarification. They are: (1) Triangular Stock—No, it's not crashproof. That bracing provides contact area for gluing. The net result is that after three years of summer and winter flying, the prototype shows no signs of hairline cracks due to vibration commonly seen around fuselage joints. (2) Stabilizer Key—Have you ever had cracks develop at the stab leading edge-fuselage intersection? The stab key eliminates this possibility in the Quikie. (3) Nose Gear—If properly installed, the steering linkage shown on the plan will disengage from the steering arm if the nose-wheel cocks over on a rough landing. This feature saves the linkage, bottom block and possibly a servo. The surgical tube nose gear bearing used in the Tatone mount eliminates quite a bit of nose gear vibration; however, the gear will not swing freely in this bearing. If it's too snug, stretch the tubing on the nose gear and re-install. Don't be leery of it—I've used this type installation for two years and never overloaded a servo. You can't appreciate the durability of this gear until you've dirtied the spinner on a rough landing.

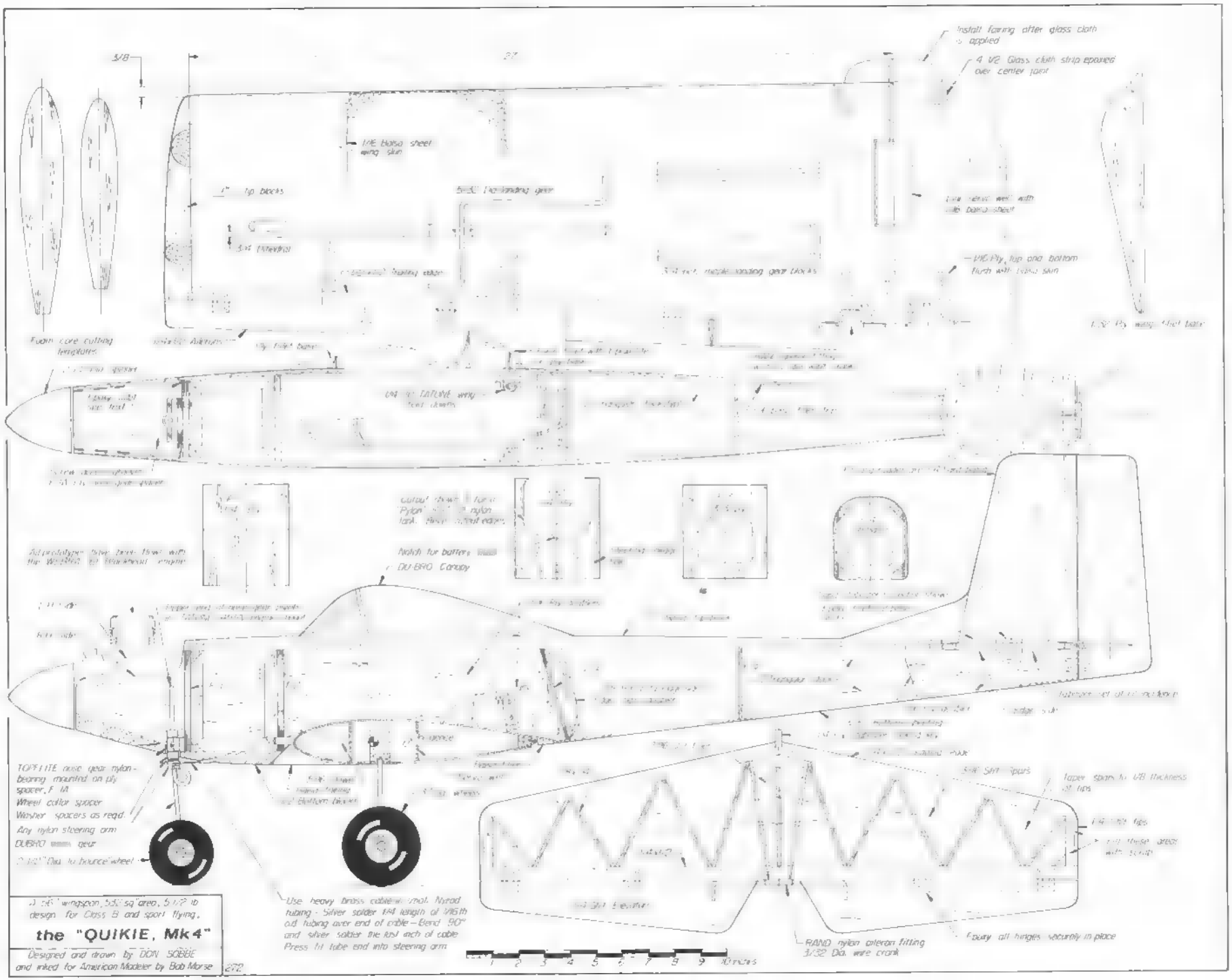
The above-mentioned items won't buy you a thing in a terminal velocity stop on a flat rock, but they will considerably extend the airframe life under normal flying conditions, and reduce maintenance.

Construction

No radio, Tatone mount, engine or linkage (other than steering) are shown

(Continued on page 76)

Scene at 1971 Nats Glenview where Don and his wife have two identical models ready for Pattern Class B competition.


the "QUIKIE, Mk4"
Designed and drawn by DON SOBBE
and inked for American Modeler by Bob Morse
TOPFLITE nose gear nylon-bearing mounted on ply spacer, F I/4
Wheel collar spacer
Washer spacers as reqd.
Any nylon steering arm
DUBRO gear
Dia. to bounce wheel
Use heavy brass cable w/ smal. Nyrod tubing - Silver solder 1/4 length of 1/16th o.d. tubing over end of cable - Bend 90° and silver solder the last inch of cable Press fit tube end into steering arm
RAND nylon aileron fitting 3/32 Dia. wire crank
Epoxy all hinges securely in place
Install fairing after glass cloth is applied
4 1/2 Glass cloth strip epoxied over center joint
1/16 balsa sheet wing skin
1" lip blocks
Notch for battery
DU-BRO Canopy
Foam core cutting templates
Aileron
Elevator
Rudder
Fuselage
Wing
Stab
Fin
Landing gear
Hatch
Cockpit
Pylon
Tank
Bottom block
Top block
Fuel tank
Engine
Cowl
Spinner
Propeller
Tail wheel
Tail skid
Control horn
Pushrod
Hinge
Screw
Nut
Washer
Bolt
Rubber band
Dowel
Balsa sheet
Plywood
Fiberglass
Epoxy
Paint
Trim
Scale
Inches
1 2 3 4 5 6 7 8 9 10

WHERE THE ACTION IS

RADIO CONTROL

DON LOWE

SPORT AND PATTERN

RC Winter Wonderland: 'Round about February of every year the "Weak Signals" Club of Toledo, Ohio plays host to what has become the biggest RC show on earth. There are hardly words adequate to describe its scope and size and the pleasure it affords the ardent RC modeler. It has everything from the very latest goodies of most of the industry to the latest RC creations by modelers who display them with pride, to the fabulous trading post where you can sell and/or buy anything in the RC vocabulary.

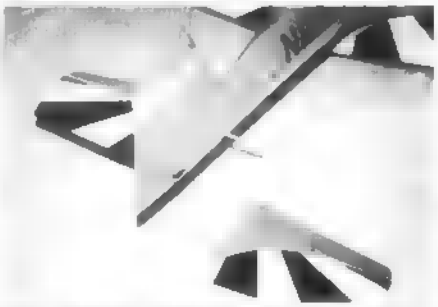
There are now a number of fine RC shows each year, but Toledo remains the "Granddaddy" of them all. It's the show for which manufacturers schedule new product releases and modelers toil long hours producing a super "Toledo Display." The show now consumes three days plus setup time for the industry. Friday was "Industry Day" but it was pretty crowded when I arrived in the afternoon. Saturday and Sunday were unbelievable in terms of the crowd. For me, Toledo is the high point of the year. A relaxing experience without the pressure of competition, a chance to ogle the goodies and spend endless hours yakking with old friends and new, comparing notes, swapping tall stories, making plans for the year. So to the Toledo Weak Signals I add my thanks for your fabulous creation and join the chorus: you simply must add more floor space next year.

Toledo solidified the opinion that helicopters are really here. I heard several expressions of "This is the year of the helicopter." This certainly appears true with the present availability of some American product (Du-Bro) and three foreign products. As Jim Kirkland expressed it: "It's a whole new experience!" Jim has been flying a Du-Bro machine and he describes it as a some thrill and a challenge—like starting over in RC flying. It is obvious from watching Dave Gray and others fly their machines that it can be mastered to the extent of very precise control, but apparently a whole new training program is in store for those who try. It looks like a terrific kick for jaded old-timers and newcomers alike. I can hardly wait to get my hands on one. I also understand that all brands were swamped with orders in spite of the comparatively steep prices. The flying demos at Toledo were pretty much given over to hell demonstrations with large crowds showing their appreciation and amazement.

Trends: The model displays at Toledo get more ultra each year with professionalism of a high order in every detail. At Toledo some faces the stiffest possible competition in all categories. Finishes are absolutely unbelievable without a flaw to be found in the winners.

There was not a pattern design competition category but pattern designs exhibited seemed to center around the theme of fast, sleek, and fairly symmetrical thrust, stab, wing setup. Typical American designs show a strong trend toward symmetry, zero, zero, zero, and speed with thinner symmetrical wings, retracts, lots of power with 60's getting stronger all the time. This American trend is in interesting contrast with

Hank Walker and genial George Hill show their "Hi-Lo" pattern design at Toledo. It is typical of stunt design trends, but a distinctive achievement of this purpose.



Jerry Nelson's pattern plane uses a "flying stab" or stabilator. Another trend?

that exhibited by some of the world's best fliers—Wolfgang Matt of Leichtenstein and his "Super Star." My son Jon and I were some impressed by Matt's flying at the RC World Championships and we obtained the plans for his ship and talked fellow club member Dick Wetzel into building one. Two others have been started in the club and after flying Dick's version, construction of the others has been speeded up. Matt's airplane has a very deep fuse, slab sided with a rather forward center of lateral area. He uses a thick semi-symmetrical section wing of about 17-1/2% constant percentage set at a positive angle on the fuse. The horizontal and verticals are *very thick*, the horizontal being about *15%* with the elevators 1" thick on the *top hinged* leading edge. The stab is set at negative incidence. The engine has rightthrust and downthrust. I haven't flown the ship much but it appears to have some excellent flying machine with very soft control response. Some modelers object to the softness since they are used to more snappy response. I don't doubt that Matt was seeking this soft control response, however, to smooth out pattern flying—his smoothness was certainly evident at the championships. The airplane has a very axial roll, does a beautiful figure M, spin, etc. In fact, I couldn't find a fault—convinced? If you want plans try this address: Wolfgang Matt, Modellbau Matt & Meir, FL-9491 Nendeln, Feldkirchserstr. 168, Leichtenstein. We paid $6.00 for our plans.

Postscript: Modeling has become my profession. A civilian employee of the Air Force for years, I recently have taken on a new job of developing remote-control craft as a tool in remote piloting experiments (fly by television) and as a weapon system within itself. We are extrapolating RC model technology into much larger sizes to provide inexpensive test beds and prototypes for operational systems. Would you believe a 200 h., 12 HP behemoth controlled by Kraft/Pro-Line or whatever driving super servos? We have been flying a 20 lb. bird with a 90Z, 12 volt television camera developed for the some programs by Westinghouse feeding a pilot's eye view to a ground pilot. Sure is a great experience and we have lots more planned.

Jimmy Grier is coooooool. He does an outside loop, wing breaks but does not separate, so he rolls out, lowers landing gear and lands as though nothing had happened. Quick Fix please.

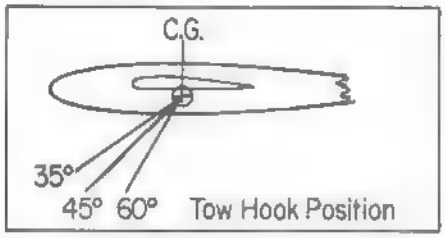
Are you guys worried about vibration effects on equipment? We experienced great difficulty with picture blurring until installing a Ross-4 for power—super smooth and a groovy picture. Can you envision flying the pattern by video link? Maybe it's the future in RC pattern competition! There is much interest throughout the Department of Defense and NASA in the use of modeling technology for military purposes. It not only demonstrates the sophistication of our hobby, but provides an inexpensive approach to worthwhile subsonic flight investigation programs. Will try to keep you informed as we get deeper into the program.

New in fueling devices. Harley Wadsworth adapted giant-size sprayer for the job. Quick Henry, bring the Flit!

CARL MARONEY

GLIDERS AND FAI

Toledo's Best Gliders: At the 18th Annual Mid-Winter Radio Control Conference and Exposition held at Toledo, Ohio, seven gliders were entered in the Best RC Sailplane Display. First place went to Otto Heithecker for his original design Snoopy. The beautiful all white 12-ft. Nimbus handcrafted by Ray Vanderdonick placed second and a modified Alpha by Tom Kelly captured third.



Surprisingly all three winners are from Michigan. The Nimbus which weighs 69 oz. has an all-fiberglass fuselage, a total wing area of 1240 sq. in. and gives a wing loading of 7.4 oz. per sq. ft.

Three other original designs which first made their debut in the glider world were: Quesoar by Neil Liptak; Seeker by Dave Corven; and Dolphin FM2 by Harry Foucher. Liptak's Quesoar was the most unique with rudder, flying stab, fully adjustable flaps, spoilers and retractable landing gear.

'71 Sailplane Wall Chart: Three-view drawings of eight original designed sailplanes that were published in various issues of the East Coast Soaring Society's Journal during 1971 have been specially reprinted for display in a 16 × 22" three-color wall chart. Copies may be purchased by sending a check or money order for one dollar ($1.00) to ECSS, 3107 McComas Ave., Kensington, Md. 20795.

Rule of Thumb: Bob Meacham of Daytona Beach, Florida has just completed an Evolution glider and wonders where the plans should have positioned the tow hook. For a fixed tow hook, one that has no adjustment possible after installation, experience has proven that optimun position for the tow hook is on the 60 degree line to the CG. Adjustable tow hooks, if initially centered and installed at the 45 degree line to the CG, provide flexibility. The 60 degree position works in calm weather, but not in a breeze. Moving the hook to the 45 degree line will work in a fair breeze, however windy or gusty conditions call for a further forward position at about 35 degrees. When installing the tow hook, back it up with a piece of 1/8" plywood on the inside of the fuselage for added strength. Those looking for a fully adjustable tow hook can purchase one for $3.75 from Herschel Terry, 682 Old Mill Rd., Dover, Del. 19901.

Winning Means Flying: The Flying Sparks of Elmira, New York will hold a meet at the famous Harris Hill site in September, where the National Soaring Museum is located. Prizes will include rides in a full-size Schweizer Sailplane. Prizes will be awarded for: Endurance, Spot Landing, Building Skills, Originality of Design and Sportsmanship. This should be an excellent meet and one in which attendance will no doubt be a record.

BOB STOCKWELL
PYLON RACING

Start of 1972 Season: The Florida Miniature Pylon Racing Association (FMPRA) got the 1972 season off to a fast start on February 6 with times like 1:35, flown by Ed Weituck with a Supertigre-powered Ballerina, 1:40.7 flown by Harold Coleson with a K&B-powered Minnow, and 1:40.9 by D.C. May with another K&B Minnow. But they weren't as consistent as Jim Demeritte of Tampa, who won the event with a best time of 1:41.2, flying another Supertigre-powered Ballerina.

These are mighty fast times early in the season, especially with 1971 engines. Johnny Brodbeck of K&B was testing a prototype of the new 1972 K&B's in February at Sepulveda Basin, California. With the help of Larry Leonard, Bob Smith, Dan McCan, and others, he set up a test course over which they clocked times of 1:22 and 1:26. Johnny was predicting times around 1:20 or lower this season! Since K&B is only making 100 of these engines, many of us will have to fly something else. We understand there will be HP 40's getting into the country, at least during the early part of the season, and Tigres are about as rare the striped cat itself.

It will be interesting also to see whether the limited availability of super high-quality engines hurts the sport or not. Many people are predicting that the guys who can't lay hands one of these super engines just won't bother to race, because they'll have the odds too heavily stacked against them. If top quality engines are not readily available to anyone who wants one, who will be responsible for killing the sport? On the other hand, some smart cookie may come along and see the opportunity to produce, in quantity, an engine as good as any of the limited production items. And on still another hand, now many pilots can handle a racer going ten to fifteen seconds faster than 1:40? The finals at the Nats not unlikely to be cluttered with mid-air collisions.

Seen at Orlando. Pix by Ron Moss of Don Lowe with nice "Little Mike" pylon polisher powered by a Tigre that turned pussycat at the wrong moment.

Quarter Midgets: These rather dismaying reflections on the state of the engine competition among the 40's bring me to the Quarter Midgets. There's a big open question about whether the National Miniature Pylon Racing Association should, or should not, get involved with Quarter Midget Racing Rules, regulation, standardization, and so on. Right now, not many hard-core Formula I buffs are flying the little ones. If it were to become another major event, like at the Nationals, you can bet that the event would grow fast—but would it grow the right way? Should it perhaps be kept as a fun event for new fliers to find out whether they like racing well enough to invest (and "invest" is the right word!) in Formula I, II and FAI.

If you have an opinion on this issue, write immediately to John Elliot, 19412 Olana Lane, Huntington Beach, Calif. 92646. Big John is collecting opinions for the F.A.S.T. Club and NMPRA in order to provide a sound representative basis for a decision.

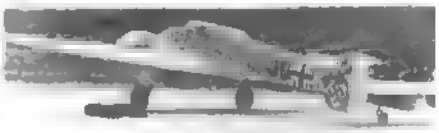
New Organizations: In line with the resurgence of activity in pylon racing all over the country, some racers, led by Bob Root and John Schuy in the Northwest, have formed a new association very cleverly named PROPS—Pylon Racers of Puget Sound. They hope to revitalize racing in the Northwest the way the United Pylon Racing Circuit has built it up in the Northeast, and the way the Chicago Pylon Club is building it in the North Central area. We congratulate all these energetic competitors and wish them phenomenal success. There's no substitute for energy and dedication, and we believe this sport is worth it.

A scale judge examines Ivor Hunt's RAF Chipmunk.

CLAUDE McCULLOUGH
SCALE

Rules Re-write: The AMA Executive Council has decreed that there be no new rules or changes to old ones during 1972 for use in 1973 and that instead, Contest Board efforts be directed at revising, clarifying and, hopefully, streamlining the present regulations. In pursuing the goal, the Scale Contest Board is asking all scale builders to provide suggestions for re-wording any sections of the AMA rulebook which are not clear. All too often statements which seem perfectly understandable to a panel of rules "experts" are subject to misinterpretation when put into action at a contest. So get your two cents worth in to your district rep on the SCB at once. Their addresses appear regularly in the AMA section of AAM. The comments they collect from the membership will be taken to the annual Board meeting at the Chicago Nationals.

Short Subject: "Measure it twice and cut it once." (From the Chicago Scalemasters Newsletter.)



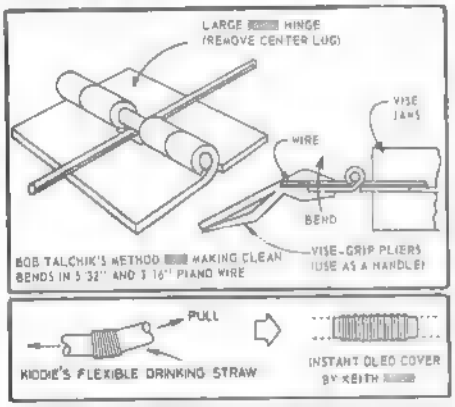
Not 1-to-1 scale, but Brian Taylor's Me-110 model. This is what we mean by good photography.

Scale Fund: Dave Linstrum, Administrator for the FF FAI Team Program, commenting on this column's recent plea of "Let's top those other category funds," says that Scale still has a way to go. The information he supplied on the well-organized FF effort shows that they have about $11,000 in the bank, mostly from entry fees paid by contestants in the Team Qualifying trials. Matching that slightly staggering sum will be a problem, particularly in the short time remaining, but it won't do any harm to try. Scale team members, in addition to the necessity of getting to the East Coast departure point, are faced with a long trip inside Europe this time. They will probably be delivered to Frankfurt, Germany and will have to go by plane or train to Montaudran, the French air technical center where the Concorde SST is under development.

The Chicago Scalemasters recently raised $150 at a club auction night. Donated items ranging from complete models, through rare items such as Monogram Cyclone Engine kits to boxes of junk were sold to the highest bidders by auctioneer Dave Platt. All proceeds were sent to the AMA for the Scale Fund.

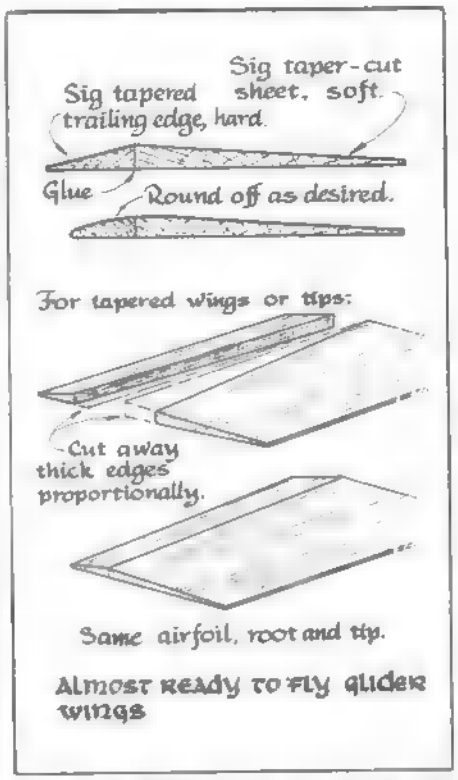
Spot Remover: Small leaks of overspray onto another color of dope that sometimes happen when trimming ■ scale model can usually be removed by rubbing the spot with ■ cloth dipped in methanol. This fuel ingredient is also handy for getting an oily model clean enough that ■ new application of Scotch Plastic Tape trim or Pro-Stripe detailing will stick on properly.

Year of the BD-5?: Anyone who reads aviation magazines knows about Jim Bede's latest bit of aeronautical legerdermain: every-man's dream plane or kamikaze—take your choice. Few would want to try ■ as a model, so all power to Walter Moucha, Sr.,



who may upstage his scale specialist son, Walt, Jr. with ■ 1/4-size version of this challenging subject. Wing span is 78" and the fuselage is molded from two layers of fiberglass cloth and five coats of resin. ■ 3/8 ■ 26" extension shaft supported by three bearings drives the prop from a Webra 61. Since another BD-5 model under construction was seen at Toledo, it may that the Nationals Scale event will be the scene of as interesting a confrontation as the appearance of two B-36s in 1970.

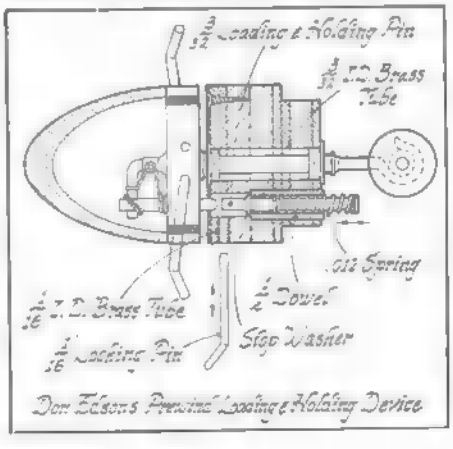
Attention, Photographers: We always have a shortage of good sharp black and white photos of new and unusual scale models. ■■ sure and take the model out to ■ runway or parking lot away from the non-scale grass and effect-killing background clutter of people's legs, cars and toolboxes. Include some details on the model and equipment. Five dollars is paid for each shot used.



4 taper-cut sheet, and 1/4 x 1 trailing edge stock, all 36-in. long, ■■ the most useful sizes. With tapered wings, or the tapered tips of straight wings, a true airfoil over the entire span of the wing results if the recipe indicated in the sketch is followed. Say 3-in. taper-cut stock is to be combined with 1-in. trailing-edge stock to give ■ 4-in. root chord, and ■ 3-in. tip chord. A 3/4-in.-wide wedge is cut away from the thick edge of the tapered sheet, and a 1/4-in.-wide wedge from the thick edge of the trailing-edge stock before they are joined, and presto!

Sheet Balsa Covered Wings: In an earlier issue (March 1971 AAM, page 36) we discussed ways of strengthening the trailing edges of sheet-covered wings that lack a normal trailing-edge strip. Here is how well-known FAI Rubber and Power event flier Thomas Koster of Denmark does it. Thomas sandwiches a strip of fiberglass tape or cloth between the upper and lower sheets where they meet at the trailing edge. Embedding fiberglass in any kind of glue results in a strong material, but epoxy would probably be best of all.

Wakefield Prop Hub: The following is the procedure for launching Wakefield. Hold prop with left hand, fuselage with right hand, and when thermal conditions are just right, light fuse with third hand, and launch model. The third hand belongs to your helper, of course. Some modelers are able to do it all with two hands, which is handy if your helper is out to lunch, but an increasingly popular method involves a "locking pin" such as that shown on John Allen's Citadel (April 1971 AAM). One catch is that the prop spinner must be put ■■ after the pin is set. Don Edson, Wading River, New York, avoids that with the design shown in the sketch.



In his design, the holding pin is in the noseblock rather than the prop hub. The holding pin is pushed into the prop hub—this sets the Montreal stop pin. The locking pin is inserted through the hole in the side of the noseblock so that its end touches the holding pin. Then the holding pin is released, and its spring causes it to retract slightly until the stop washer catches the locking pin. The end of the holding pin still protrudes into the prop hub. Next, the motor is wound, the prop shaft is connected to the motor bobbin, and the noseblock ■ inserted into the fuselage. The locking pin is then removed, and the motor torque will prevent the holding pin from retracting. When ready to launch, grasp the prop, turn it backwards a tiny bit which will permit the holding pin to retract, and launch the model. If it appears that my drafting has improved, please don't write the editor about it, Don Edson did the drawing.

Another Great Idea Down The Crack: In the January 1971 issue of AAM I suggested the possibility of running ■ compressed air engine from ■ Freon aerosol can, because a manufacturer had told me that he was investigating that source of power. I should have known better, but it took a letter from Dr. Helmut Ziegler, of Switzerland, a consultant chemist for aerosols, to make me see the light. It won't work—at least not well enough to be useful. Freon 12, the only Freon worth considering, is a liquified gas. When the pressure is released, heat is extracted from the remaining liquid as part of it boils away, and it quickly cools to the point where it no longer boils off gas—unless heat is supplied. It is impractical to obtain enough heat from the air to boil the Freon in ■ reasonable flight time, so heat would have to ■■ supplied from a boiler. But then we have a "steam" engine, not a compressed gas engine. Besides, Freon has ■ high molecular weight compared to air, CO_2, or water, which ■ a chemist's way of saying that it doesn't produce much gas volume for its weight. Not just "theory"—Helmut has tried it. It is nice to know that someone besides die-hard free flighters read this column. Helmut is Chairman of the Scale Subcommittee of the CIAM, the organization that administers international competition.

FREE FLIGHT

BOB MEUSER

SPORT

Scholarship Contest: On June 24th and 25th the Boeing Management Association will hold its third annual $1500 Model Aeronautics Scholarship Contest at the Boeing Space Center, Kent, Washington. Any boy or girl 18 or under is eligible. The format will be much the same as last year (see page 41, May 1971 AAM). Additional information may be obtained by writing to The Boeing Management Assn., P.O. Box 3707, Seattle, Wash. 98124, attention Ted Johnston.

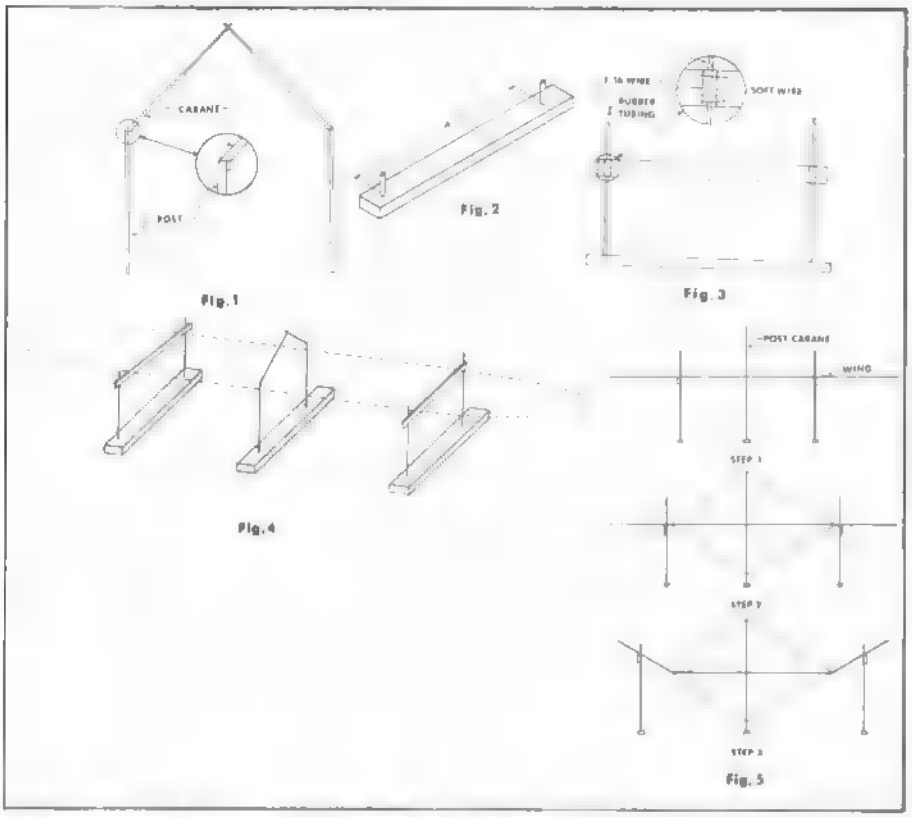
Almost-RTF Glider Wings: Ernst Johnson, Rancho Cordova, California, uses soft Sig "taper cut sheet" balsa for the aft portion of his hand-launch glider wings, and hard "trailing-edge" stock for the leading edges. They are glued together along their thick edges, then after ■ few licks with the sanding block the wings are completed. ■ variety of sizes ■■ available from Sig; 1/4 x ■ and 1/4 x

BUD TENNY

INDOOR

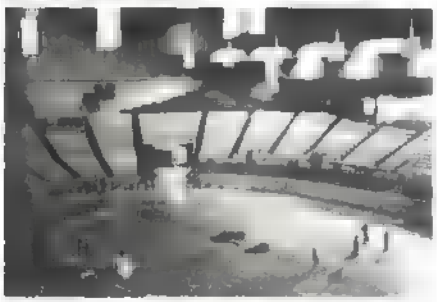
Building Braced Wings: The May and June columns dealt with fixing weak or warped beginner models with enough bracing to make them fly. This lets the beginner have fun flying instead of building another model that might also be too weak. The second model a beginner builds may as well be braced, since this is also ■■ easy task with the proper equipment and instructions. Begin the bracing by attaching a cabane to the wing posts as shown in Fig. 1.

Bracing Fixtures: Fig. 2 and Fig. 3 show two fixtures which will handle any size model within reason (most bracing jigs will fit only one width wing). Fig. 2 shows a simple balsa block with tissue sockets, where "A" is the width of the wing at the center rib (the same spacing as the sockets on the fuselage). Fig. 3 shows an adjustable support fixture—two must be used for normal bracing work. The base is balsa, with two 1/16" dia. music wire posts attached with epoxy. The crossbar is



balsa with rubber tubing lashed on with soft copper wire. The rubber tubing provides height adjustment with friction lock.

The Bracing Operation: Assemble the posts and cabane as shown in Fig. 1, then insert the assembly into the fixture of Fig. 2. Arrange the adjustable fixtures and the post/cabane assembly as shown in Fig. 4, with the crossbars adjusted to a fairly low level. The work surface should be smooth and level, and the fixtures fastened down with masking tape. Slide the covered wing between the wing posts below the cabane and rest it on the adjustable supports. Fig. 5 shows the proper sequence of operations. Step 1: Raise the wing until the leading edge and trailing edge fit into place under the cabane. Glue the wing to the post/cabane assembly and let the glue dry thoroughly. Step 2: Move the supports outside the dihedral break location and install the bracing as detailed in the June issue. Note that the adjustable feature of the supports allows wash-in and wash-out to be installed easily. Step 3: Carefully cut halfway through the spars at the dihedral break and bend the tip upward to the proper dihedral angle. Use the support to hold the tip at the proper height while the dihedral is glued in. Note that if center dihedral is used also, that it can be installed in Step 2.



Inside the Cow Palace. Those nuts down there are flying indoor towline gliders! Story coming for "On the Scene" by Meuser. Indoor is fun.

WALT MOONEY
SCALE

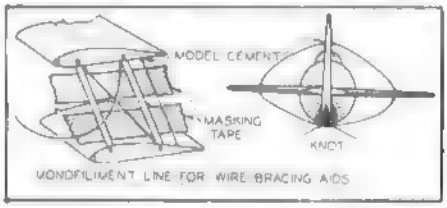
Resolving the Junior Problem: Stuart Howard, here pictured holding my Peanut Scale Bucker Jungmann while I crank in the winds with an indoor winder, is the son of George Howard. The model pictured is not terribly important, but there are a couple of important things the picture illustrates. One is the simple act of stretching the rubber motor for winding. This is the most significant thing a beginner can do to increase his model's flight duration. The most important thing in the picture is Stuart himself. He is pretty young but he is interested in everything and anxious to be helpful, however he doesn't care too much for Dad's models--they make too much noise. Little Peanut Scales or sport models with cowboys on top really inspire Stuart and an old guy with a Jungmann that will even let him hold it for winding really pleased him.

The point of all this is that from time to time I hear about the "Junior problem." Part of this problem is caused by the fact that most of the older builders and model fliers are having too much fun to take time with the kids. Some people are doing a great job, however. For example, Richard and Ed Whitt and the Flying Dutchmen who put out "Star Skippers" the official newsletter of the N.F.F.S. Mini and Maxi postal contests and the voice of young Junior modelers. Eight issues a year are available by sending them $1.25 to Box 176, Wall St. Station, New York, N.Y. 10005. Their messages are really aimed at the Junior modeler and their postal contests look the greatest. I could have used this 36 years ago.

As another example, Bill Hartill of the SCAT Club sent a flyer announcing the SCAT Annual All Junior Contest. Here is a contest aimed at all those model builders under 14, and run by the Southern California Aero Team.

If more of the clubs in the country took a little time out to emulate the Whittens and SCAT, there sure would be more youngsters out flying models.

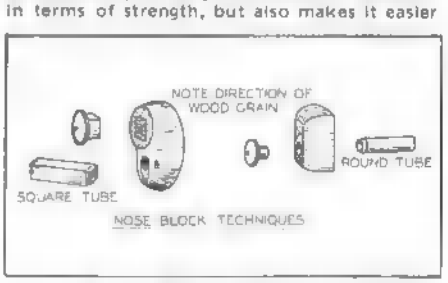
Simulated Bracing Wires: A lot of the older aircraft have bracing wires. On Peanut scale models the simulation of these wires can be easily done using monofilament fishing leader. It's readily available wherever fishing supplies are sold and can be obtained in a variety of sizes. For the small scale model its best characteristic is that it will shrink with the application of a slight amount of heat. Thus, it can be installed in a somewhat slack condition and after all the cement is dry, passing the model over a stove will give tight flying wires. If the line is ten lb. test or under, this can be done when the wires run through the tissue covering where there is no



structure underneath. For example, as shown for the tail brace wires, simply poke pin holes through the surfaces at the appropriate points and thread the monofilament line through and knot at the bottom of the fuselage. Put a drop of cement at each point of contact and let it dry. Pass this over the stove carefully and nice straight taut lines will be the result.

The cross bracing at the wing struts or between the ailerons is a little more difficult to install because it doesn't go clear through the surface; therefore the ends are harder to hold in place while the cement dries. An aid that works well is masking tape. The tape will hold the line in place while it is trimmed to length and the cement is drying. After removing the tape, a slight amount of heat will take the slack out of the wires.

Nose Blocks: Balsa wood is strongest in compression if the loads are applied in the direction of the grain. Loads on rubber models are mostly applied in the direction of flight as far as the nose block is concerned. Making the nose block with the wood grain, as illustrated, not only makes it more effective in terms of strength, but also makes it easier



to cut square or round holes to accommodate thrust bearings. Square and round tubes are available at most model shops. A sharpened end of the tube as shown can be pushed through the block to give a hole that is neater than would be obtained using a twist drill.

WHERE THE ACTION IS *Continued*

BOB STALICK

GLIDER, RUBBER AND POWER

Odds and Ends—Hints and Kinks: Everyone has his own way of resolving modeling's little problems; some of us just go on living with our mistakes, while others solve them. For instance, how many times have you epoxied in those blind nuts on the back of your firewall, attached your firewall, built up everything and then found that the super sticky stuff got into the nut threads? Then the fun begins! Fellow club member, Al Grell, just pushes some modeling clay into each nut before he epoxies, leaves it in until he's through, then runs the bolt in—instant clean out.

Al also has a neat trick that he uses when he's feathering in that rear fin or sanding anything that is next to something he doesn't want sanded or marred. A strip of masking tape adhered to the surface to be protected ■ all it takes. *Now, why didn't I think of that?*

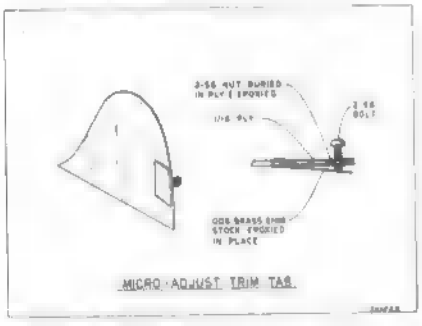
Ever find yourself wishing to hook up an auto-rudder on your power ship? And there you ■■ without a fancy Seelig timer, but one ever-present Tatone flood-off. Well, don't despair, just run a line from the flood-off wire extension to the auto-rudder, just like the Seelig. You don't even have to invert your timer—just route your line through ■ U-shaped wire with its feet epoxied into the fuselage side 1 in. or more in front of the timer, then back to that flood-off wire extension. *Presto*—instant auto-rudder.

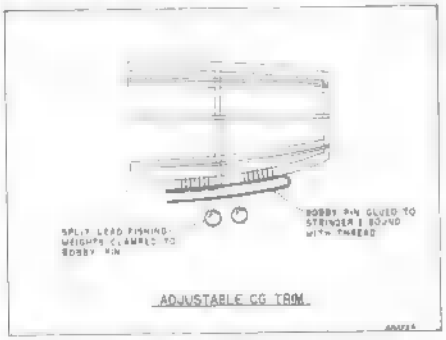
Neil Comfort ■■■ an adjustable trim tab that has infinite positions. This gadget gives you ■ way around using those trim tabs cut into the fin and then glued and hoped into the correct place, also ■■ unsightly TE stock glued to the side of the fin, just a slight twist of the screwdriver and everything's shipshape.

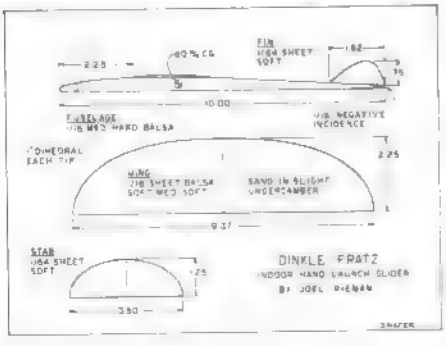
Sport-type free flights and many others could benefit from Jeff Long's suggestion to epoxy or glue and thread ■ bobby pin to the nose ■■■ and clamp fishing weights of the split shot variety to the pin. Weights can be added easily until the correct center of gravity is located—then crimped into place.

Joel Freiman enjoys flitting his Dinkle Fratz mini-hand-launch glider indoors and out. Possible to build out of the scrapbox, the D-F is the kind of glider that can be built and flown by the dozens for little investment in time or money, showing us once again that free flighters have more fun.

Bitsa Models: Everyone has them. A wing here, a stab there, ■ fuselage over there. Ever put them together to see what would happen? Some look unloved. After all ■ Stardust 900 stab is as big as the Duster X wing. Sometimes, though, those bits fit pretty well together. Some modifications to this or that will give you a model that would be competitive at the local contest field. Dave Linstrum used a Stardust X wing and stab on ■ new fuselage and flew it as a "Starworm," with a Cox 09. Verrry fast! Now, if you've got some 550 to 600 sq. in. size wings around the shop and a stab that looks like it's ■ match-up, join us next month for some Hot Lumber for them, coupled with a good 29 or 40.







BOB HATSCHEK

GADGETS AND EQUIPMENT

Balsa Buster: There's ■ man named Peemoeller who smashes balsa wood as an extracurricular activity. To some extent we all do this, but Mr. Peemoeller is not ■ model builder—he's ■ high school teacher. All model aviation enthusiasts can learn ■ ■■ from him.

Peemoeller teaches ■ course in Strength of Materials at Brooklyn (New York) Technical High School, and as an instructive extracurricular activity h■ runs an annual contest among students to see who can design and build the strongest structure within a certain set of specifications. This year, for example, he ran a "Strong Tower Contest" calling for the construction of ■ 12" high tower built out of no more than 15 three-ft. lengths of 3/32" sq. balsa held together with Ambroid cement. Winners in the strength category (there's also one for structural beauty) are determined ■ a 100,000-lb. Baldwin-Southwark universal hydraulic testing machine. The towers are simply set under the ram one ■ ■ time and are slowly crushed. A reading (the machine is sensitive ■■ within 5 lb.) is taken at the point of failure, and the heaviest load wins. This year's winner, which weighed about an ounce, failed at 1800 lb.

It's ■ good contest—and popular. Peemoeller crushed about 130 towers this year. The lesson for model builders, of course, is ■■ structural strength of balsa. Tossing out the data on towers that fail in buckling (poor structural design or poor craftsmanship), it appears that each piece of 3/32" square can take ■■ axial compressive load in the range of 25 to 40 lb. This isn't ■ "pure" figure, of course, since most of the structural members are laminates of balsa and glue. And, unfortunately, no data has been recorded on the density of the wood as correlated to its ultimate compressive strength.

Nevertheless, for those readers with an engineering turn of mind, that load calculates out to a range of 2840 to 4550 lb. per sq. in. (PSI). As to grade, call it medium to hard, but note that none of the material ■■■ what this correspondent would call "very hard." And, don't forget, this was pure compressive loading along ■■ grain—no shocks, no landing impacts, no hitting fence posts on dethermalizing.

Hoppe Up That Gummy 1/2A: Here's ■ useful tip from Larry Renger for eliminating the shellac deposit that forms so readily in 1/2A engines. Just add 1 oz. of Hoppe's No. 9 gun cleaner per pint of fuel. Larry, who's a project engineer for Estes Industries in Penrose, Colorado, flies his free flights at mile-high altitudes where engines just don't perform as well ■ they do at sea level. Other suggestions

John Tatone flew these in FF Power at 1963 Nats. Use of aluminum in FF models not new.

he passes along are to lap out the piston-cylinder for a looser fit and use a higher compression-ratio head both of which also improve performance down here in the thicker air.

Are Diesels Better for FAI?: Compression ignition engines, commonly called diesels, won't run on the same fuels as glow engines. That basic fact is recognized in the FAI international regulations that spell out what fuel can be used in competition a straight alcohol-oil mixture for the glows, and almost anything for the diesels. This raises a question: Would the contestant be better off using a diesel with a muscular brew than the virtually ubiquitous glow engine on straight fuel?

James A. Kloth, St. Petersburg, Florida, thinks the answer is an emphatic yes. The one he likes is the Eta Elite Mk II, which he used in placing second at least year's Nats (Open FAI), and which his daughter used in placing fourth at the same Nats (Senior FAI).

The fuel Jim burns in his Eta is 50% kerosene, 30% ether, and 20% castor oil with a 1-1/2% dash of amyl nitrate. This is quite a mild brew, and it can be heated up considerably with a few of the legal-for-diesels-only nitrates. Nevertheless, Jim gets the engine up close to the horsepower and torque peaks at 16,000 to 17,000 rpm with a Cox 8 x 4 silver plastic prop. Switching to a Bartels 7-1/2 x 3-3/4 adds about 2500 rpm, Jim says, but it costs him about a third of his altitude.

He points out that power models don't "fly" up much any more—they "helicopter" up. And, among other things, the lift of a helicopter is a function of the swept disc area, which, of course, increases with the square of diameter. This, Jim feels, gives the edge to the diesel with its inherent ability (higher torque) to swing a bigger prop.

Another favorable characteristic of diesels is that rpm's are much less variable ■■ ■ function of propeller load. This means that despite the model's changing speed in flight, the rpm remains relatively constant. And this, in turn, results in a much less erratic performance.

CONTROL LINE

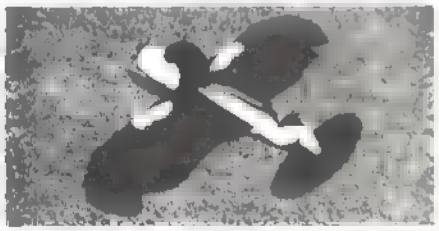
BILL BOSS

SPORT AND SCALE

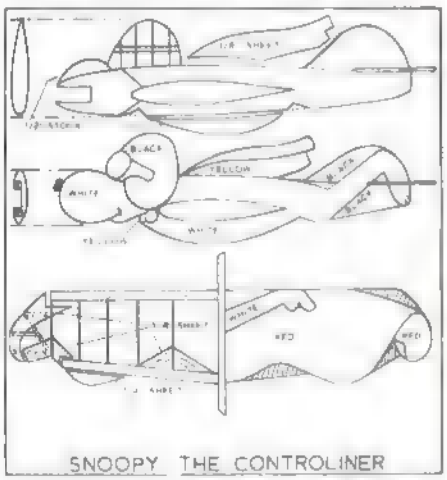
Now Hear This: *Wanted*—Club and organizational newsletters, individual tech tips, and anything you believe would be of interest to other sport and scale CL fliers. Submissions have fallen off considerably, especially in the scale category. Let's hear

about your latest projects—the column can only be as good ■ you make it. By all means submit photos of your project under construction or finished, but please submit them in black and white. Prints of "jumbo" to 5 x 7" size are preferred. While everyone likes to see color photos these days, they are not as good as black and white for reproduction purposes. Now that we've told you of our needs, let's see the articles come rolling in.

Snoopy: It just had to be. Snoopy has been written about, talked about, has flown on the dog house in RC, and now we present Snoopy the Controliner as designed by SSGT Charles E. Bowman USAF. The friendly foe of the Baron was made by modifying a standard Ringmaster as shown in the accompanying sketches. The top sketch shows additions to the basic Ringmaster fuselage to achieve the famous profile. Balsa stock of 1/2" thickness is used to form the top of the nose and belly sections, the scarf is cut from 1/16" or 1/8" sheet and finally the helmet section is built up with ribs (the same as wing construction) and covered with 1/6" sheet. The center sketch



Snoopy is long overdue for CL rendition. Many other characters have ■een modeled over the years. Charles Bowman did it at last.



shows the completed fuselage profile and the basic Snoopy color scheme. You will no doubt want to add your own finishing touches. The bottom sketch shows wing modifications to achieve the flying cape outline and the top view color scheme. For extra strength in the wing, cover it with silk.

While complete construction details are not given, the sketches and a little ingenuity of your own ought to bring Snoopy to life. A good starting point in modifying the Ringmaster might be to make a full-size drawing of the fuselage and wing, and then draw in the modifications. It's better to make the mistakes on paper rather than during construction. Note: No changes are made in the tail section—assemble as shown in the kit. When completed, Snoopy will fly well on a good 35 engine, and will be a crowd-pleaser as he chases "YOU-KNOW-WHO!" through maneuvers and around the circle.

Scale Kits: The scale builder looking for a new project might drop Bob Holman ■ line requesting his latest listing of plans and kits. The latest listing received from Bob shows a substantial increase in the number of Complete-A-Pac (CAP), Scotland kits available, most of which are in the 1-1/2" or 2" scale size. With recent emphasis on larger scale planes this new line of kits should do well. The larger size makes scale detail duplication ■ bit easier.

While the kits are designed to accommodate RC equipment, there is no reason why the more experienced UC Scale builder can't make the necessary modifications and add the UC controls. Aside from the plans and kits, Holman has available a wide selection of Kooaburra books and Aero Modeller scale drawings. For complete listing of kits, plans and books send 25¢ to Bob Holman P.O. Box 741, San Bernardino, Calif. 92402.

Helpful Hint: Polyester and epoxy resins don't mix. When adhering anything to fiberglass don't use epoxy cements. Most fiberglasses a■■ made with polyester resins and will not bond properly with epoxy type cements. When installing such items as motor mounts and firewalls ■■ fiberglass use a polyester base resin.

JOHN SMITH

SPEED AND RACING

A Difference of Opinion: Have received much mail this month since turning over the soap box to you ■■■■■. If nothing else was settled, at least it showed that you are reading the column.

On the question of .15 Rat, the opinions ran from making lines longer on 40s, to slow the turn rate down, to contests having big turnouts in Junior fliers since going to 15s, to one flier who said, "I'll burn my AMA card and melt down my $1000 worth of STs and K&Bs before I'll run 15s!"

On the 60 class of speed (C), I heard from a number of fliers including some "top drawer" guys. Their suggestions ■■■■ to run from "use FAI fuel, chop the displacement to 40s, make it mandatory that all speed circles ■■ fully fenced, go to longer lines in C, limit C to ■■ open fliers only." So you can see that many people have opinions on what to do to help perpetuate our sport. The soap box ■ still yours. Let's hear from you.

Charles Melancon and Ron Esman know value of fast pit stops. Rat races ■■ after only seconds on the ground. Looks as if they have not seen it.

Hertz Rent-A-Driver Maybe: A suggestion has been made that speed fliers can either start the engine or fly the model. The writer has ■ point. The airplane is what goes fast, the guy on the pole is, in reality, only the driver. Since some .of you ■■ pushing to get around the pole in time with the airplane, why not allow the builder/owner to pick a good pilot to fly it? The only requirement would be the pilot would have to be the same age division or lower—you couldn't have an Open division pilot fly for a Junior. Sounds good.

Back-Up Airplanes: Why not allow a back-up airplane in CL Speed? Pans and engines are changed during a meet if damaged. Why not the rest of the model? A lot of times models ■■ damaged due to mishaps like jumping the dolly, etc. Why not allow ■ second model to be used if the first is damaged? In Philly a few years ago, a 1/2A Speed engine was passed around between contestants all day long. It must have had ■ dozen officials on it.

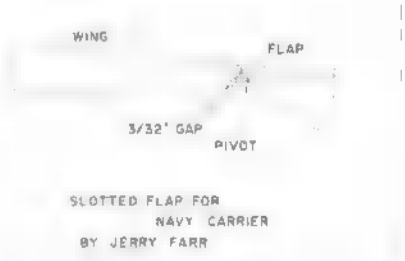
New Fun Event: The Cleveland Aeromodel Society (PO Box 16091, Cleveland, Ohio 44116) is running a Formula V team race this summer, 3/4" scale Goodyear type racers, profile, with Cox 049 ready-to-fly engines, reed valve only. Fifty cents will bring you their racing rules and a full-sized drawing of a model. Another half buck will buy ■ copy of their fine newsletter, $5.00 per twelve issues.

JOHN BLUM

CARRIER AND STUNT

Carrier Wing Flaps: Many approaches to this aspect have been used. Jerry Farr of Abilene, Texas presents the slotted-flap idea as shown in the sketch. Jerry relates that the flap is more effective in this manner, and uses it in conjunction with ■ flat-bottom wing. The setup is used on his profile-carrier F-8 Crusader. He also relates exceptional performance of the Series 21 McCoy 35 RC for the Carrier event.

The Carrier rules specify a minimum of 300 sq. in. of wing area. Profile kits such as the Ringmaster, Mustang, Flite Streak, etc., exceed this. Considering the extra area, the



need for wing flaps is arbitrary. When building to the 300 sq. in. minimum, wing flaps do help and flap area should be included within the 300 sq. in. minimum.

Adding flaps, either in addition to or as part of the wing on many available kits, presents problems when the kits ■■ designed without flaps. Profile models of this type usually have a wide wing root cord. Consequently, the location of the wing flaps in relation to the tail moment (trailing edge of wing to leading edge of stab) is too far rearward. Thus, when the flaps are lowered for slow speed, the extra lift is rearward and forces the nose downward dictating extreme up-elevator to keep the model in level flight.

These undesirable characteristics can cause severe flight problems, particularly in windy weather. However, properly designed, wing flaps do add the extra life for that point-getting slow flight. Coupled with working ailerons, as depicted in previous issues can enhance the flight. The profile offers an excellent opportunity to experiment.

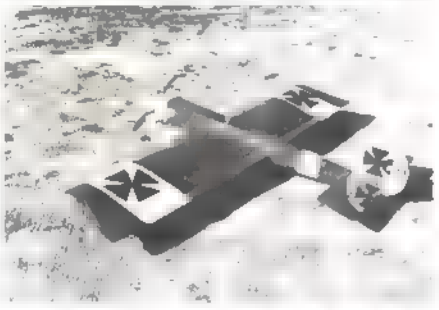
Technical Information: Gary Moore (103 Apartment F, North Romney St., Bayside Gardens, Charleston, S.C. 29403) writes that he can supply addresses for Military Tech Manuals and information on aircraft.

Muffler Clip: In the San Jose (California) Aero Modelers Newsletter, Marv Wentz offers the following idea. Tatone mufflers can be prevented from slipping downward by adding a retainer clip of 0.030" thick steel to the top of the muffler, so that one end bolts to the muffler and the other end bends downward until contact is made with the top of the exhaust stack. The existing muffler features hold it to the stack and prevent upward movement. Thus, a little spring tension on the clip will hold the muffler.

WHERE THE ACTION IS *Continued*

Info for this column can be sent to John Blum, 2417 Glen Pl., Granite City, Ill., 62040.

Different Stunt Model: The Fokkerdecker is another approach for the different look while maintaining flyability. Powered with a Series 21 McCoy 40, model performs well. Bill Noyes of Valinda, Calif. relates model design



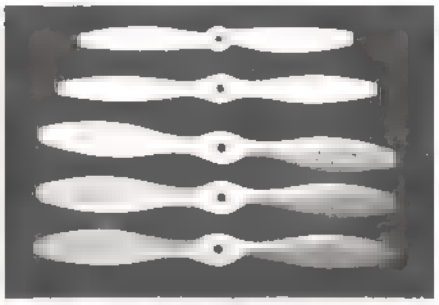
A serious Stunt event contender is this creation of Bill Noyes and Dave Holzberger. Uses a Series 21 McCoy 40 engine with Murphy muffler.

is aimed at the modeler who wants to build from scratch with a minimum of building time and still have top performance. The constant cord rib and straight lines, plus the approximate 550 sq. in. of wing ■■■ and the 1:17 moment ratio enhance the model.

HOWARD RUSH

COMBAT

New Propellers: Two new brands of props are available in sizes that will interest Sport and Combat fliers. Bill Keller is molding glass-reinforced resin propellers in 7-3½, 7-6, 8-8, 11-7¾, and 11-8 sizes. The 7-6 is just right for FAI Combat and Goodyear racing; the 8-8 is for AMA Combat and Rat racing. The glass props ■■■ rigid as wood, but are strong enough to hit the ground or your fingers without breaking. Nobler designer and engine hopper-upper George Aldrich now supplies props for Combat. Available in 9-6, 9-6¾, and 9-7 sizes, the Aldrich Custom wood props feature accurate pitch that is constant from prop to prop. For more information, write Bill Keller, 201 Ashwood Ave., Dayton, Ohio 45405, and George Aldrich, 3219 Shady Springs, San Antonio, Tex. 78230.



Shown above are the fiberglass props from Bill Keller and wood props from George Aldrich. Anyone else got new props?

On Lines and Connectors: Marvin Denny of Amarillo, Texas, a member of the AMA Combat Rules Committee, has conducted extensive tests on control lines, line ends, and connectors. He found that .018" stainless steel cable ■ good shape will take 31 to 34 lb. tension per line without breaking. That's better than 60 lb. total pull, because tension is almost always equally distributed between the two lines.

Why do lines break? Line connectors are receiving ■ lot of blame. The most popular connectors for Combat ■■ the large slide types, rated at 49 lb. per clip. Tests by Denny, Frost, and others show that these clips, even after much use, are still stronger than ■■■ lines—if you remember to slide the sleeve closed. If left open, these clips are only good for 25 lb. each.

Another culprit in line breakage is the way line ends ■■■ made. In Denny's tests, soldered ends were always weaker than the lines themselves, regardless of wrapping method or type of solder used. Soldered ends are not only weaker in tension, but they also ■■■ subject to high bending loads at the end of the stiff soldered wrapping wire. Factory crimped-tubing line ends ■■■■ found by Denny to ■■ consistently weaker than the lines. The only adequate crimping method he found was a Thomas and Betts industrial swaging tool, not available to most modelers. The best method for line ■■■■ is the method specified by the AMA (refer to page 19 of the 1971 rulebook). The AMA method uses an eyelet and double wrapping of the control line end with copper wire. Because commercially available lines are always too long to be legal for Combat, there is plenty of cable present to allow cutting off the factory ends and wrapping them properly.

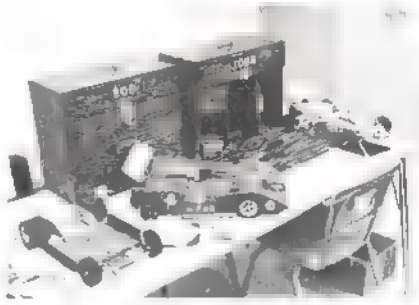
To avoid line breakage and flyaways, the modeler should inspect his lines often for kinks, damage ■■■ broken strands. He should use strong enough connectors and make sure they are properly fastened. ■■ should wrap the ends of lines ■■ they are ■ least as strong as the rest of the line. If these precautions are taken and if contest directors would begin to enforce AMA safety standards, there should be fewer flyaways.

special interest

BOB BECKMAN

RC CARS

Rules and Competition: The February issue of the "Sky Rebel Yell," published by the Cobb County Sky Rebels (Marietta, Georgia) had an editorial comment that applies just as well to our cars ■■ ■ does to their planes. "... If you will think about any competitive



Seen at the RC Car Conference. Left, Delta's Flex Pan chassis. Center, Bob Baker's Delta McLaren. Right, John Cary's beautifully detailed open wheeler.

sport which is performed subject to rules, you will realize that the same good, dedicated performers will end up on top. For example, car racing rules ■■ constantly changing, but Petty, Foyt, Andretti, Donahue, etc. still stay ■■ top. Sure, a rule change may give someone a temporary advantage, but over the long run it is the same group of people as before who eventually comes out on top. What I'm saying is if you have trouble winning, don't blame the rules! Look instead at yourself, and change the things you are doing wrong. With enough dedication, assuming you have the talents, and in many cases the dollars, necessary, you will be among the winners. When you think of rule changes, think of changes which will improve the event and help the sport, not changes which you think might cover up your own shortcomings."

Jerobee Radios: Several people have been running radios from Jerobee cars in 1/8 scale cars, and with good results. Now Jerobee has ■■de the radio available separately. The dry cells for the receiver work quite well, but replacing them with a NiCad pack is ■ good investment. (See April 1972 AAM for a review of the radio in Thorp's car.)

RC Car Conference: To the best of our knowledge, the following report from C. L. Titus covers a first of its kind. This is the way the annual Toledo RC conference started and there is no reason it can't be done for cars.

"On January 9, 1972, the 1st Annual RC Car Conference was held at Lakeland Community College, Mentor, Ohio. Clubs participating were: Lake County Modelaires (Cleveland); Akron Spin-Outs; Toledo 1/8 RC Racers; and Detroit AM Cars.

"The program started at noon with registration and floor discussion in the display room where approximately 70 cars were on display, plus displays of kits and accessories by: Ruth's Hobby Shop, Akron; South East Hobby, Cleveland; and Parma Model Raceway. There was also a trading post filled with all sorts of RC car gear.

"One area of great interest was Ken Cambell's Delta System with his new flex pan chassis for Delta cars, and Delta's new radio system with super-fast servos and rugged gear train. Another was John Jacobs and his scratch-built car with great workmanship, capped off with some great ideas: front wheel brakes, fuel tank mounted forward, clutch that kicks in at 10,000 rpm, and other interesting items. During this period there was also a great sharing of knowledge.

"At 1:30 racing movies of the Riverside 500 and others were shown. The films were supplied by the Firestone Tire Co. A raffle was held at 3:00. A question and answer session was held in the auditorium with questions directed to ■ panel consisting of Ken Cambell, John Jacobs and Frank Dawson. Many of the often unanswered questions about car tuning, setup, etc. were answered by the panel.

"At 4:30 the Ohio Racing Circuit meeting was held with representatives from Akron, Toledo, and Cleveland, with the specified goal of forming a racing circuit. This was accomplished with each club agreeing to host

two races during the season. A copy of the schedule or any further race information may be obtained by contacting C. L. Titus, 399 Liberty St., Painesville, Ohio 44077.

"Because of the great amount of interest shown in a conference of this type, the Lake Country Modelaires plan to make this a bigger, better, and continuing annual event."

The conference was made possible by the College and the clubs which participated. In addition, the following donated prizes: Delta Racing Systems; South East Hobby Shop; Parma International Raceway; Associated Electrics; McKenna Products; Model Auto Racing Supply; Heathkit; Dremel Mfg. Co.; Rocket City Enterprises; and Kraft Systems.

CLIFF PETERS

RC BOATING

Toledo Show's Boats a Hit: Once again the Toledo Show brought out bigger crowds than ever with greater interest than ever in boats. Dealers showed more models than previous years but the superb scale crafts were the real hit as attested to by the admiring onlookers.

TV Covers Model Boat Activities: The latest San Francisco Model Yacht Club Newsletter gave the story of TV coverage of their boat activities on two separate occasions. This club shows real go-getter activities and has the right idea by getting the type of publicity which bring countless favorable comments from the public which in many cases never realized what RC boating can mean. Don Donovan fired up his steam tugboat and it was a hit on the tube. A second TV show indicates that some of the boys are on their toes and getting the type of publicity which does the entire boating fraternity a lot of good. If they can do it so successfully, it's an excellent demonstration of what the rest of us could do if we really tried. This club also has gone into a noise abatement program which wouldn't hurt the rest of us to copy.

John Bridge's "Lead Sled" hydro was first in competition at Toledo. He looks happy.

Newsletter Shows Real Initiative: The "Monocle" of the Barons Model Club (Spokane, Washington) showed up with an actual advertising section which is not limited to hobbies. We have seen ads before in newsletters, but these boys have gone all out for what looks like a most sensible and profitable addition. Their ads include tires (not for models), real estate dealers, printing companies as well as ads strictly in the hobby line. It looks like a good way to get the necessary cash to publish a newsletter.

This columnist can't overlook another section in the "Monocle," for two reasons. While the club was basically a flying club, there is now a model boating section. The second point we enjoyed: the editor of the boat section also has the same name—"Peters." He is Bud Peters and shows the usual touch of genius of those who are fortunate enough to have the "Peters" name. The boating section is swell, keep it up, Bud.

The Star Is Almost Ready: By the time this is in print, my own 45" Dumas Star should be well trimmed and sailing. At present it is almost finished. We are at the painting stage now—a little more work and we will be at the water's edge.

JOHN BURKAM

HELICOPTERS

RC Helicopter Competitions: On Friday and Saturday evenings at the '72 Nats there will be a gathering of RC helicopters and their pilots at the workshop hangar for competition in design, workmanship and very simple flight maneuvers.

Rumor has it that Dieter Schluter and Fritz Bosch are planning another international RC helicopter competition in West Germany in September 1972. Simple maneuvers are prescribed, with points being awarded on the basis of time required to complete the maneuvers, as in a canoe or ski slalom.

Franco Marcenaro says the Italians are having an international model helicopter competition in Milan on October 5, 1972. Entries received already from France, Germany, Italy and Switzerland.

New World Record: Manfred Kufner of West Germany established a new world endurance record of 1 hr. 12 min. 23.5 sec. using an especially lightened Schluter Hueycobra.

Helicopters At Toledo: Six different designs of helicopters were displayed at the Toledo RC Conference. The Whirlybirds of DuBro Products were flown by Dave Gray and Bob Bentley on both days. Not high performance jobs, but good trainers which do little damage in a crash, and are easy to repair.

Dieter Schluter and Horace Hagan flew their famous Hueycobras. Dieter threw in a couple extra revolutions in his stall turns, but later got shot down by CB interference in 27mh. After overnight repairs he flew again on Sunday, much closer in, and demonstrated the precision flying of which he is master. Dale Willoughby, of Model Helicopters (14695 Candeda Pl., Tustin, Calif. 92680) says that he will continue to sell Hueycobras, possibly through his sailplane distributors. The new low price of $350 to $400, possible through quality mass production by the German firm of Schuco-Hegl, will not be in effect until July or August.

A 3/4 size Japanese copy of the Schluter Hueycobra was displayed and flown on Sunday by the Japanese. Engine was Enya 45, rotor diameter 80 in., weight 8 lb. Beautiful workmanship. Sales of the kit in this country are held up pending licensing agreement with Schluter.

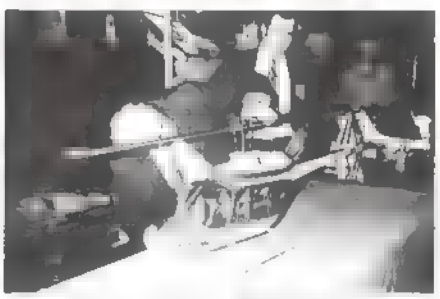
The gorgeous Bell Jetranger model of Kavan, engineered by F.W. Biesterfeld, showed great promise, although it was not flown. Powered by a 60 engine, it had an understung 63-in. rotor with a true Bell stabilizer bar and mixing levers to combine pilot control and bar input to the blades. This helicopter has collective pitch control, operated by a fifth servo connected parallel to the throttle servo. This control will allow more precise and quick control of height when hovering close to the ground and will make autorotation and rapid descent from a height easier. This kit will sell for about $400 through Model Rectifier Corporation's dealers.

Gene Rock's beautiful new Porpoise with white fiberglass fuselage was on display. This is an advanced model of his altitude record helicopter. Addition of the shell made it too heavy to fly, so the shell was removed for flying on Saturday. Two bevel gears in the tail rotor drive system sprung apart under load, making flights brief and of a rotating nature.

My own DSE-1 made a few brief flights of up to 30 ft. altitude and a few good landings. The bad landings proved that a helicopter with a slow turning rotor (500 rpm), and folding blades, can fly again after turning over, simply by straightening out the blades. The floats it had were of styrofoam and were actually tried out in a two-car garage, flooded to a depth of 1½ in. of water. Surface tension on the large flat bottoms made takeoffs tricky. First the right float lifted off, the helicopter tipped to the left; then the left float lifted off, and it went dashing off to the right. For future tests, the floats will be tilted up in front so that only the heels are touching just at liftoff.

Horace Hagen prepares to fly at Toledo.

Gene Rock's Porpoise at left with Burkam's DSE-1 at right on floats. Rock's model will be construction feature in August issue.



Franz Kavan assembles the Bell Jetranger at his booth at Toledo.

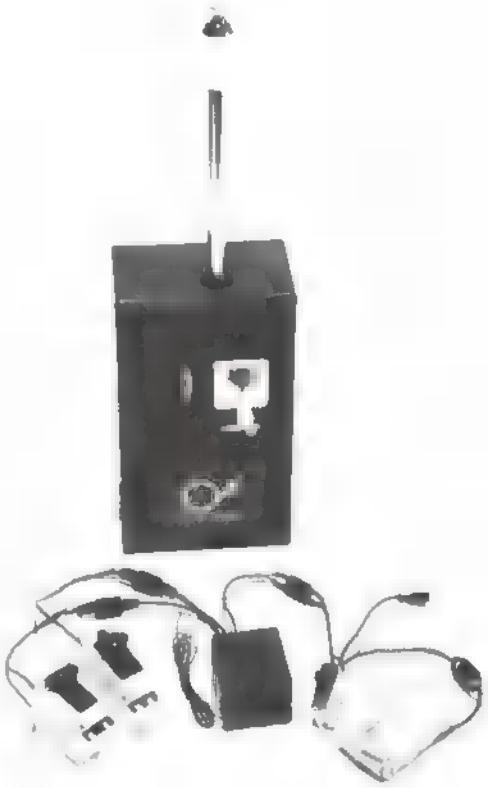
Neat tail rotor control on the Kavan Jetranger.

PART IV

AAM Commander

COMPLETED SYSTEM FINAL ASSEMBLY AND CHECKOUT.
TROUBLE-SHOOTING AND DISCUSSION OF EXPANSION TO EIGHT CHANNELS.

by FRED MARKS



Is this your new radio? AAM Commander logo is made from a printer's offset plate. You can make one with your name on it too. Very stylish.

As we stated in Part I, this fourth article will be devoted to providing a better understanding of the system, and thus any digital system. We hope to achieve this by presenting system integration procedures, by indicating how parts of the system might be used with other systems, by presenting trouble-shooting procedures for those who have some test equipment, and finally, by relating some of the things planned for the near-future which will permit expansion of the system.

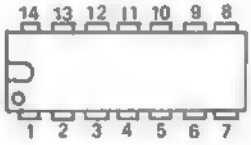
System Integration Procedures

At this stage it is presumed the reader has carefully reviewed the first three parts of the AAM Commander series and perhaps constructed the system. The individual tune-up procedures were described in detail for the transmitter and receiver, and servo neutral set-up instructions were provided. It would be wise to review those detailed procedures before the integration procedures to follow are studied.

The use of batteries and switch harness arrangement were largely left up to the builder, depending on his planned system application. The following recommendations are in order: (a) It is rather pointless to buy alkaline energizers for the receiver or transmitter packs at around 70 cents per cell when excellent 450 mah nickel cadmium cells, which may be recharged hundreds of times, can be purchased for around $1.50 to $2.00 per cell from several sources; (b) If alkaline energizers are used, three will suffice to provide 4.5 volts for operation of boats and cars; (c) If three alkaline energizers are used for power planes or gliders, R10 and R13 in the receiver should definitely be reduced to 820 ohms; (d) While the builder may take liberty with the power harness for the airborne unit, the arrangement shown in Figure 1 is strongly recommended. The switch hook-up should also be used for the transmitter. A double pole, double throw switch is used to permit easy addition of an external charger. If a charger is to be used, the charging plug or jack should be connected to the back "off" contacts of the switch as indicated. Plus from the charger must go to plus on the batteries and minus to minus; (e) The transmitter will provide quite satisfactory operation from a 9 volt dry battery such as the Eveready D-6 or Mallory 1603, but don't substitute anything of smaller capacity. This size battery will provide about eighteen hours continuous operation. (f) The most satisfactory arrangement is to use a 450 mah, 9.6 volt nickel cadmium pack for the transmitter. (g) Suitable external chargers are available from ACE R/C, Royal Electronics, and many electronic stores but be sure they provide the proper charge rate for the cells selected for the system, i.e., 10% of the milliampere hour rating. (It should be noted that the subject of batteries, chargers, quick-charge, battery care, and other information regarding batteries could be written which would easily surpass the volume of this entire article. When time and space permits, it will be written.) (h) The transmitter may be operated on just seven nickel cadmium cells (8.4 volts) for car and boat operation. (i) Alternatively, if the modeler finds it necessary, for flying in a high interference area, the transmitter may be operated from 10 nickel cadmium cells or eight pencells (alkaline) for 12

One of the design objectives was an airborne system which ▬ be operated from any commercial transmitter. Here the six-channel transmitter flies the two-channel airborne set.

IC pin numbers. Refer to this to measure voltages and scope tracings.



volts. However, heat sinks should be added to Q6 and Q7 in the transmitter RF section.

Assuming, at this point, that the transmitter, receiver, decoder and servos have been constructed and the batteries selected, the following procedure is used to integrate the system.

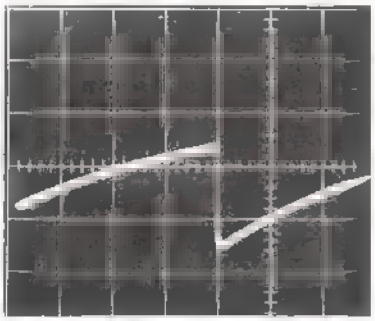
Tune the transmitter in accordance with the instructions in Part II. If a scope is available, set the control pulse widths to precisely 1.5 ms. If not, set the resistance of the 6k control pots at 2500 ohms using an ohmmeter for ▪ close approximation. Connect the receiver and decoder and tune the receiver as described in Part III with the airborne pack connected to the decoder, but no servos. When a plastic case is used for the receiver, no further tuning is needed. If an oscilloscope is available, check the waveforms throughout in accordance with the scope traces provided with this article. The servo potentiometers should have been set up in accordance with the instructions in Part II, i.e., use an ohmmeter to set the resistance at the terminals to which the short blue wires connect, to 2500 ohms with servo output centered. Disengage the servo motor pinion gear from the servo gear train. Turn the transmitter and receiver "on." If the servos do not neutralize, i.e., the motor continues to run in either direction, remove the transmitter board from the stick assembly to permit access to the stick adjustments. Loosen the ball lock screws and, with stick and trim levers centered, slowly rotate the stick adjustment (which looks like a gear) until each motor ceases rotation. Engage the servo motor pinion gear to the gear train and make the final minor adjustments. If the transmitter pulse widths were set accurately with ▬ oscilloscope, ignore the preceding two steps and, instead, set the servo to exact center by loosening the feedback pot screws slightly and rotating the pot element until centering is correct. Check for smooth, linear travel in both directions. If ▪ metal receiver case is used, it will be necessary to retune L2 and L3/4 via holes in the metal case which give access to the tuning slugs. Remove the transmitter antenna and have a helper back slowly away until a maximum range is reached at which servo motion is no longer steady. Carefully tune L2 and L3/L4 while the helper moves back slowly until the new peak of L2 and L3/L4 is found at which servo operation is smooth.

Having completed the preceding integration, the system is ready for installation. If ▪ glider or power plane is to be flown, a full range check with transmitter antenna extended should be made. Have a helper walk out with the antenna held upright while slowly and steadily moving one control back and forth. Caution him not to move the other control as it is desireable to use its steadiness ▬ an indication of solid operation. Hold the model at head level and check operation to a range of around 500 feet. Solid operation to this point is an indication of solid operation to ▬ air distance several times greater.

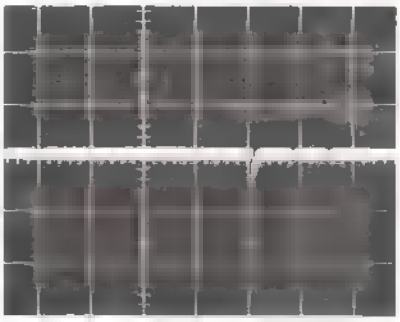
In Case of Difficulty

In building ten systems, the builders encountered few problems, most of them readily corrected by changing the instructions. These corrections were incorporated in the instructions provided in Parts II and III. One problem was encountered which requires action: The

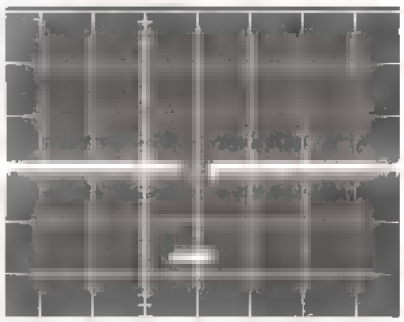
(Continued on page 82)



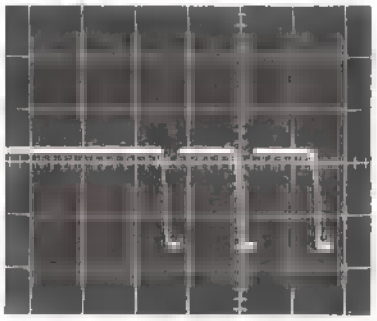
1. Output of Q1, unijunction master clock, 1 v/cm vertical, 2 ms/cm horizontal. Absence means Q1 or C1 bad or improperly installed. Frame rate may be changed by changing value of R3. Increasing gives higher frame rate.



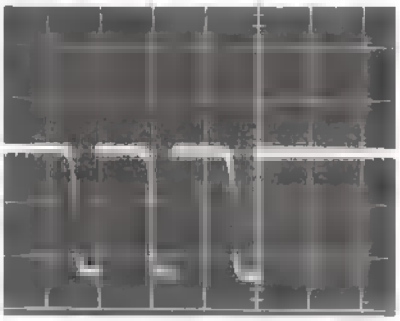
2. The differentiated vertical segment from Q1 junction of and C2. 0.1 v/cm vertical. ms/cm horizontal. Absence means C2 bad. 1C-1 possibly bad improperly installed. Similar waveform present at junction of C8/R6.



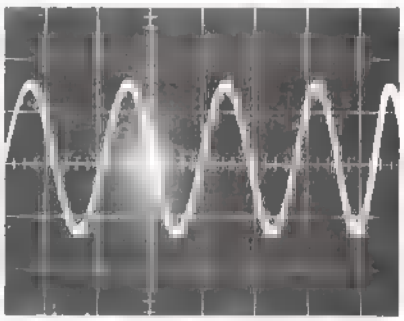
3. Output of encoder one-shots (both look alike) available at pin 14 of 1C-1 and 1C-2. Absence means 1C-1 (or 1C-2) bad, C3 bad, control pots badly out proper setting (for 1C-2) C4 is bad. v/cm vertical. 2 ms/cm horizontal. The width of the pulse should be 1.5 ms, variable from 1.0 2.0 ms control pot.



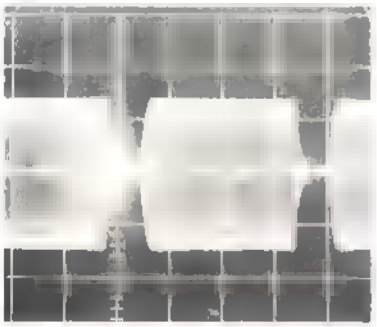
4. Output of expander E3 junction of and . 2 v/cm vertical 0.2 v/cm horizontal. Absence means 1C-3 is bad, provided the three differentiated spikes appear at inputs to E1 and E2, respectively, at pins 6, 7, and 13.



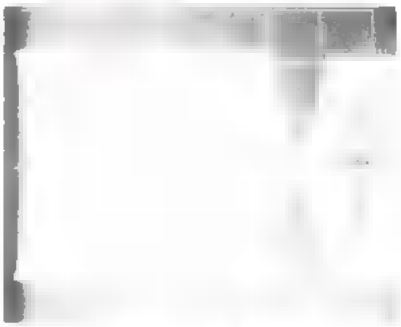
5. Output collector of Q2, 2N3646. .2 v/cm vertical 1 ms/cm horizontal. Provided that the output from expander E3 was correct, absence of signal means that Q2 is improperly installed. Note shape of the pulse; it not absolutely square but shaped as shown.



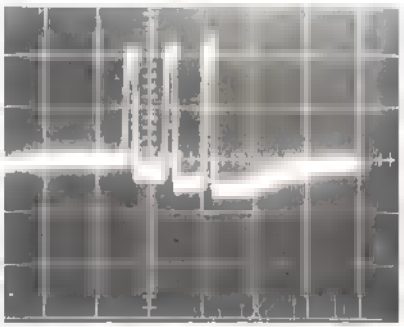
6. RF output from Q6/Q7. v/cm vertical. 0.02 sec/cm horizontal. Visible only on a scope capable of displaying 27 MHz.



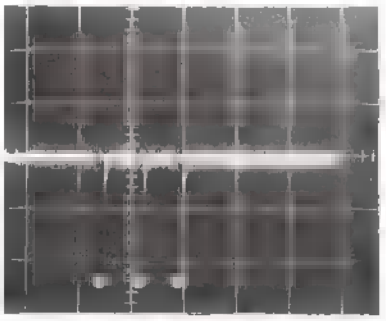
7. Receiver mixer output at Q2 collector. 0.5 v/cm vertical, 0.4 ms/cm horizontal. Lightly shaded area is the 455 KHz envelope. Problems here from lack of local oscillator operation via failure of Q1 XTAL; improper construction of L2 and L3/L4; or improper operation of .



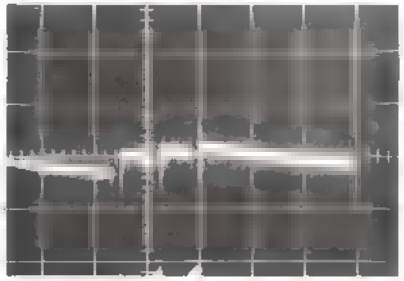
8. Typical IF waveform at output Q4. 0.5 v/cm vertical. 0.4 ms/cm horizontal. Similar waveforms of varying amplitude and sensitive to transmitter are present at the output from T1, Q3, and T2. Action may traced by viewing waveform from the output of each of the preceding components. Exact measurements are possible only with exactly known input signal level from a signal generator. Signal levels for full AGC limiting condition are listed.



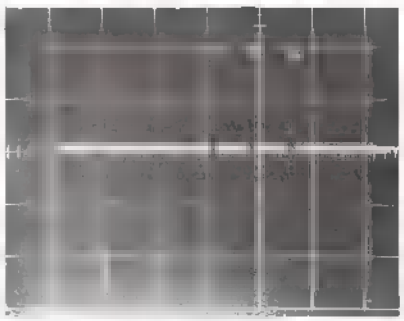
9. Detected output at collector of Q5. 1 v/cm vertical, 2 ms/cm horizontal. With AGC full limiting, i.e., transmitter nearby. The amplitude at this point should change only gradually as transmitter range is changed. Abrupt changes are an indication of AGC instability. Absence of signal at this point is bad, provided that IF signal was present through to output of T3.



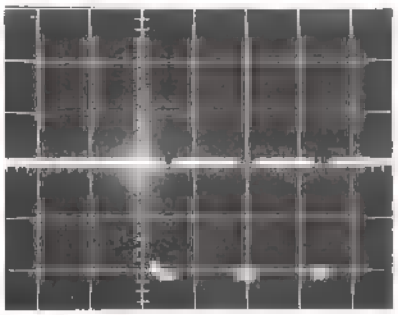
10. Output at collector of v/cm vertical. ms/cm horizontal. Shape should be square as shown over full receiver range. Absence of signal either Q6 or C22 is bad improperly installed given that the proper signal level was present at the output from



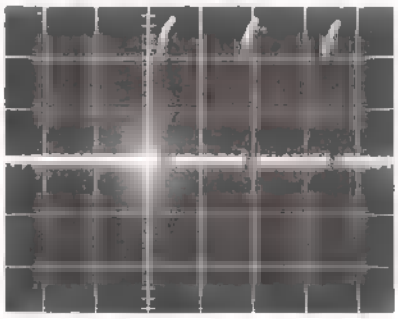
11. Capacitively coupled output to decoder. 2 v/cm vertical, ms/cm horizontal. Absence of signal means C23 is 1st inverter decoder possibly shorted, given that output from Q6 correct.



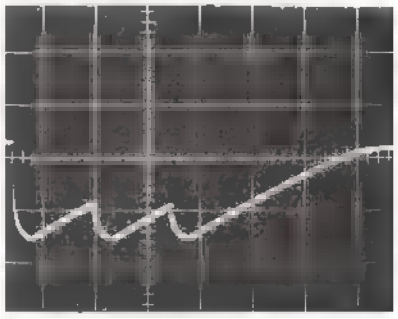
12. Output from first inverter of decoder SN7404 at pin 12. If signal input at pin 13 was correct (i.e., the same as output from on the receiver), absence of signal means decoder 1C-1 (SN7404) is bad or improperly installed. 2 v/cm vertical. .2 ms/cm horizontal.



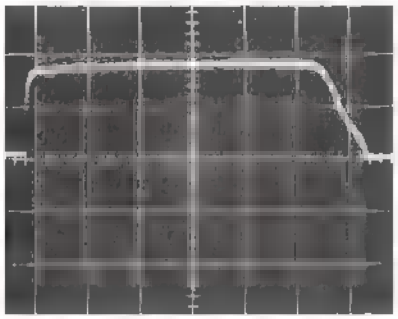
13. Output from second inverter of decoder 1C-1. .1 v/cm vertical. 1 ms/cm horizontal. Absence of signal, given the proper signal at output from first inverter, means 1C-1 is bad or C1 possibly shorted. Available at pin 2.



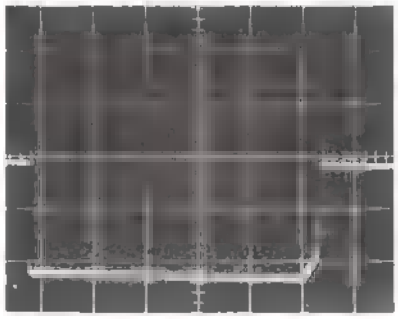
14. Output from third inverter of decoder 1C-1. .2 v/cm vertical. 1 ms/cm horizontal. Absence of signal, given proper input from second inverter, means 1C-1 is bad. Available at pin 4.



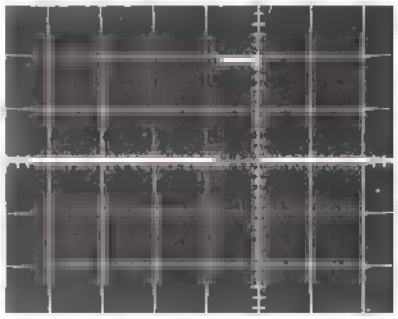
15. Input to fourth inverter of decoder 1C-1. Note the integration of pulses from the second inverter coupled via D1 and integrated by C-3. .1 v/cm vertical. 1 ms/cm horizontal. Incorrect signal here could be caused by D1 or C3 bad or incorrectly installed (check these first) or 1C-1 is bad. Available at pin 5.



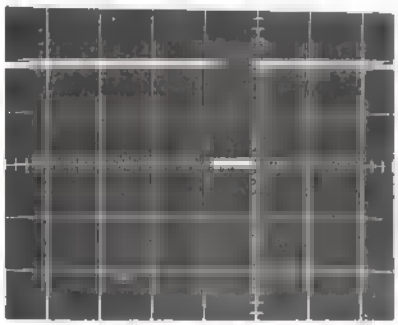
16. Output of fourth inverter of decoder 1C-1. 2 v/cm vertical. 1 ms/cm horizontal. Note that this inverter is controlled by the inverter input which was a sawtooth. If the output has a sawtooth appearance, C3 may be out of tolerance on the low capacitance side. If the input was absent, absence of output can be caused only by a bad 1C-1. Available at pin 6.



17. Output of fifth inverter of decoder 1C-1. This inverter inverts the output from the fourth inverter, further squares and inverts it. Absence of signal means 1C-1 is bad or, possibly, the line for 1C-2 is shorted. This can be checked by cutting land between pin 8 of 1C-1 and pin 14 of 1C-2 and checking signal. Output from fifth inverter is available at pin 8 of 1C-1.

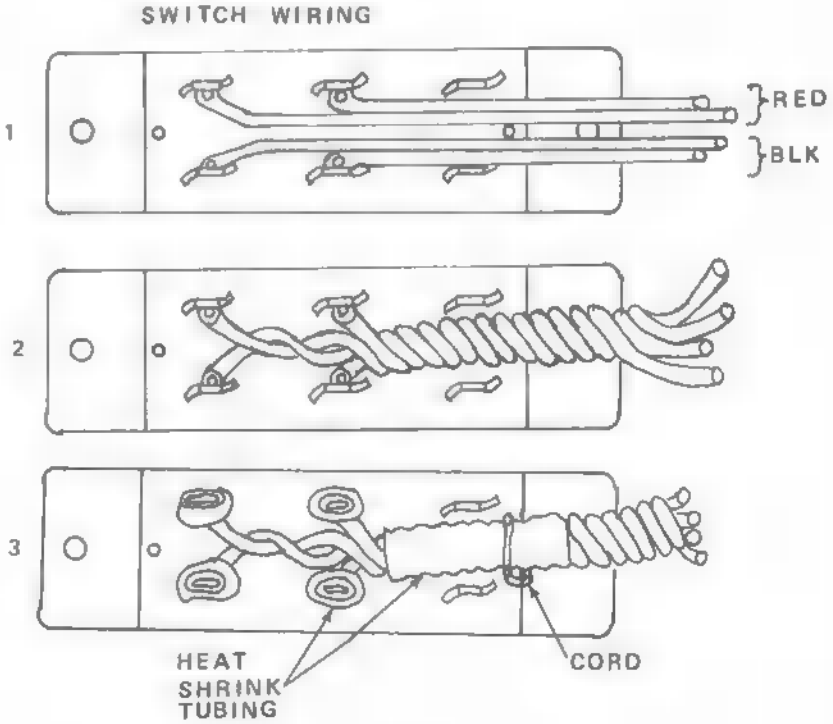


18. Output of Q for either FF-1 or FF-2 (at pins 9 and 12). 2 v/cm vertical. 2 ms/cm horizontal. If input clock pulses at pins 1 and 5 of 1C-2 look like the output at pin 4 of 1C-1 and the input to pin 14 of 1C-2 is correct (i.e., as for pin 8 of 1C-1), the only cause for lack of signal is a bad 1C-2. It is possible for this signal to be degraded by a failure in a servo so it should be checked both with and without a servo plugged in.



19. Output of for either FF-1 or FF-2 (at pins 8 and 13). 2 v/cm vertical. ms/cm horizontal. This is the inverse of Q and the same comments apply.

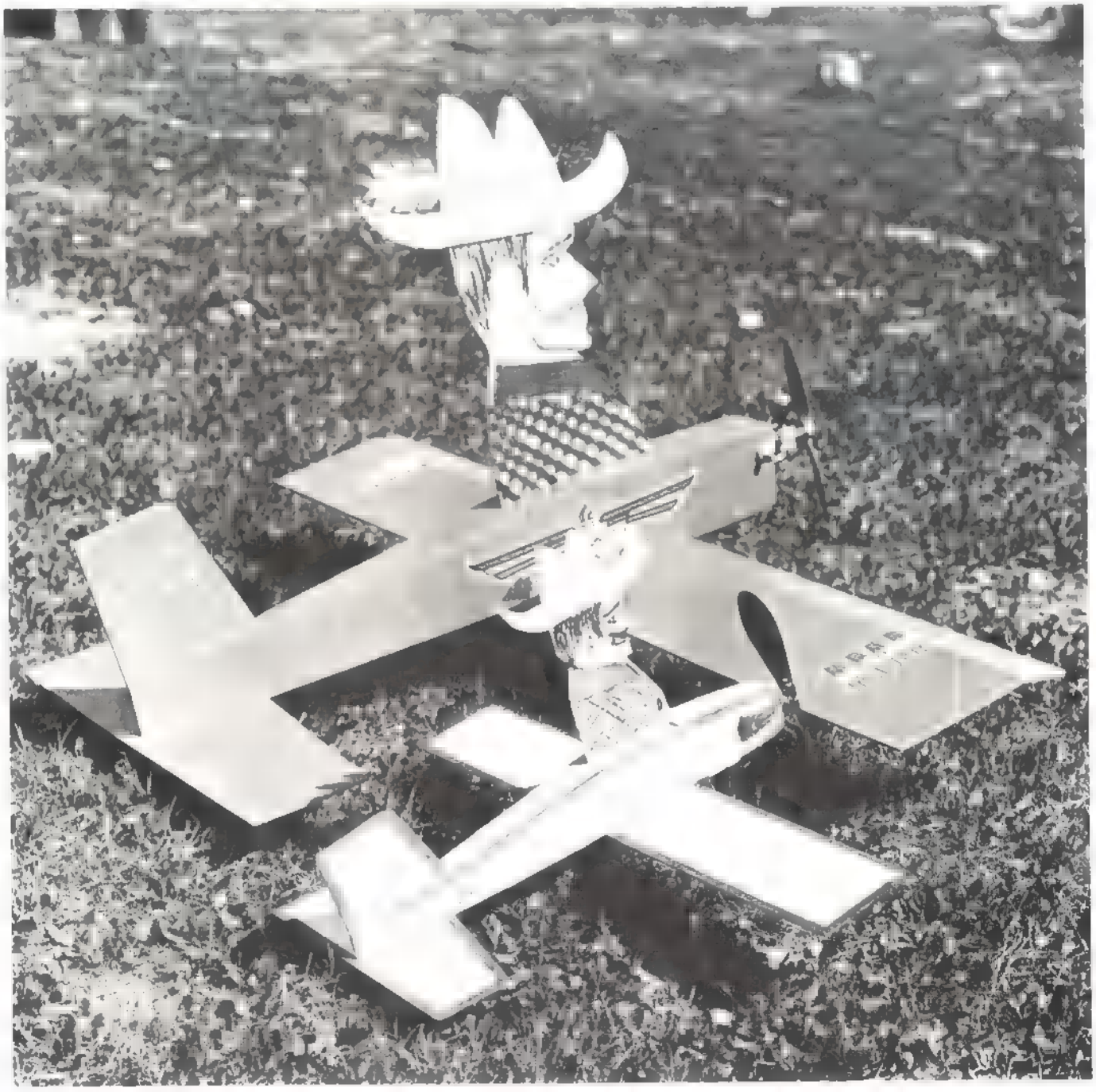
Figure 1 here illustrates our suggested switch wiring which allows the unused contacts to be wired for a battery charger.



Tenderfoot Tom

PILOT CHARACTER ACTUALLY GIVES THIS MODEL ALL THE STABILITY IT NEEDS. YOU CAN BUILD GAS OR RUBBER MODEL FROM THESE PLANS.

by WALT MOONEY



Tenderfoot Tom and his airplane were evolved to help the newcomer in model aviation get started along the road to flying fun. Originally, it was intended that the model should be a simple sheet balsa, rubber-powered plane. The concept worked so well that subsequently it was suggested that it be applied to a sport gas FF. It works fabulously there too!

Older hands in the model rustlin' game will immediately notice that neither version has the slightest bit of dihedral: in fact, the wing of the little model actually sags a tiny bit. They will shake their heads and mutter, "No pilot could stay in that kind of saddle." Ah! But they don't know what a great wrangler our pard Tenderfoot Tom is. Without the pilots, these little models are truly impossible to fly free flight. U-Control, yes; but free flight? Not a chance.

With Tom aboard, these models are really easy to fly safely and should do well for even the tenderest of tenderfeet. It's been the experience of most beginners that dihedral joints are hard to make, so we have eliminated them completely and use a perfectly straight wing from one tip to the other. To keep the model from spiral diving and biting the dust, a pilot is provided. He is actually a forward fin –and he does a superb job.

The rubber model is capable of flights exceeding 30 seconds; the gas job will climb up almost out of sight on a full tank. It will do beautiful unassisted ROG takeoffs and glide down to perfect landings. It was built in three hours, one of which was spent waiting for two coats of paint to dry.

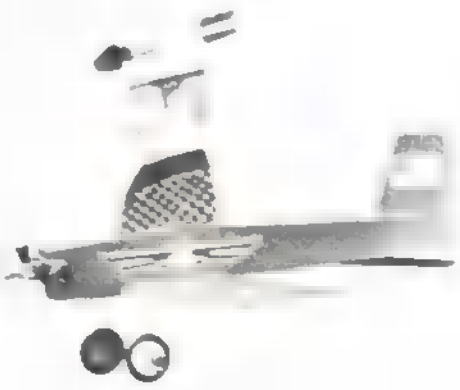
Our Agressive Scandinavian (forward fin) is not a new idea for providing spiral stability. To give credit where credit is due requires an admission that it was invented, and used on a hand-launched glider in the late 1800s, by an illustrious gentleman named Lanchester. It worked then and it works now.

Construction

The cutaway drawing shows all the pieces in a disassembled arrangement. Note the direction of the grain in the balsa pieces. Only half of the wing is shown—so when it's made it is 13 in. long. The following instructions are for the rubber-powered model. The dimensions of the gas-powered model are simply doubled except at the nose, which will be covered later.

Cut out all the balsa parts. Cement the wing parts together to give the angled airfoil section shown. Lay it on a piece of waxed paper and block up one edge so it will dry at the proper angle.

Construct the nose block from a piece of ½" thick balsa with the grain as shown; make a hole in it to fit a hardwood nose plug. Cement the two sides to the nose block after first poking the rear peg holes in the sides and the



centers of the bulkheads, and then cementing the centers (circular discs) to the sides as reinforcements. Make sure the front edges of the sides come exactly to the front of the nose block. Now cement the two bulkheads in place and let this assembly dry.

Decorate Tenderfoot Tom with a felt pen *after* giving him a very light coat of dope or sanding sealer on both sides. Cement the hat brim on both sides of the pilot, tips together. Cement the pieces of the arrow to the crown as if Indians had shot it through the hat. Bend the landing gear wire. Install the wheels on the wire, using a drop of cement (be careful not to get any cement on the wheels).

Now cement the wing in place on the assembly of the two fuselage sides, two bulkheads and noseblock. Cement the front bottom in place, and the top covering in place as far back as the second bulkhead. Let this dry.

While it's drying, install the propeller on the hardwood thrust bearing, using 1/32 diameter wire for the hook and a couple of thin washers or sequins for bearings, and a 4" diameter plastic propeller. Note the loop in the wire at the front of the propeller which will make winding with a winder easy.

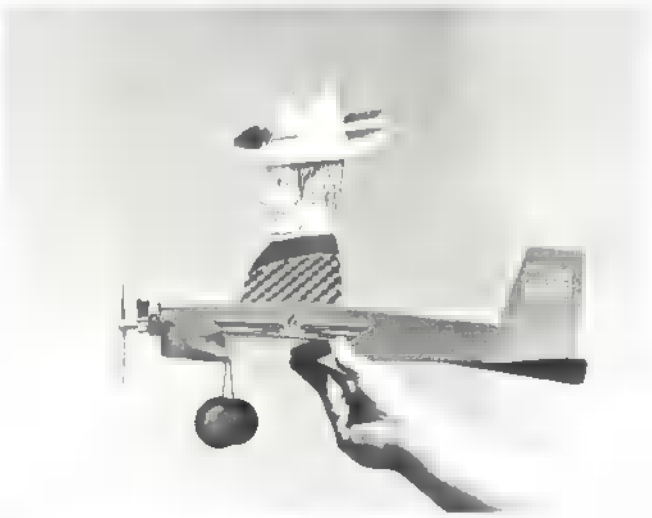
Now cement the tail end of the fuselage sides together. They can be held in place with straight pins. Cement the horizontal tail in place and then the top and bottom of the rest of the fuselage. It helps to leave about a half inch of the bottom uncovered directly under the rear peg so the rubber is visible at this end when installing the motor. When dry, sand this assembly and then add the vertical tail, ventral fin and the pilot. Make sure that these three pieces are vertical and parallel to the centerline of the fuselage. This is the most important operation during construction of the model: if these parts are not properly lined up, the model will be harder to adjust.

The dummy cylinders are only for appearance, so add them now if desired. A very light coat of sanding sealer or dope all over the model is now in order. The original model was given one light spray coat of Magic Brand sanding sealer. Now lightly sand all the fuzz off the model and decorate it as desired with felt pen. The landing gear is held on with a short piece of masking tape.

Install a loop of 1/8 flat rubber ten in. long. Check to see that the balance point is at the proper place: if not, add weight at the nose or tail to make it balance and Tenderfoot Tom is ready to fly. Bending the trailing edge of the rudder in one direction or the other will make the model turn as desired.

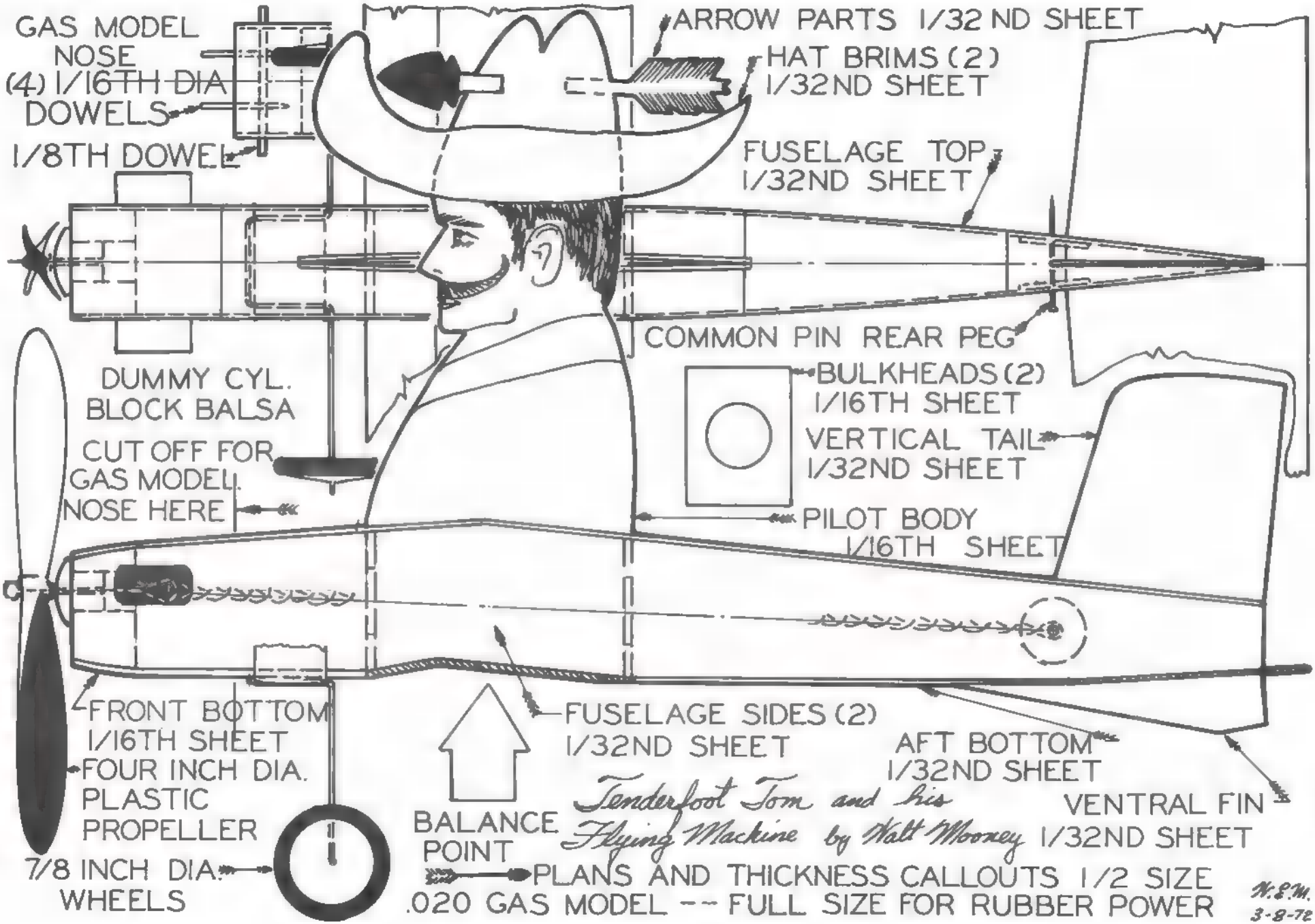
Construction of the gas version is identical except for the details necessary for the rubber motor and the nose. Because of the weight of the 020 engine, the nose has to be shorter for balance. Using the motor as a guide, push four sharpened dowels into the nose block to locate the motor. It should be located fairly close to the top of the block. Drill a 1/8" diameter hole through the nose crosswire of the fuselage and install the 1/8 dowel. The engine is held on with several small rubber bands. This was done to make thrust adjustments easy. However, no adjustments of any kind were required on the model in the photos. After the first couple of flights, a slight tweak of left rudder was added to keep the glides from being so straight.

The gas model needs to be fuelproof, so give it a couple of coats of fuel-proof paint before it's flown.



Curtis Mooney holds while his dad winds up the rubber-powered version of Tenderfoot Tom.

Both sizes of T-Tom are all balsa. Note here the simple but very effective wing airfoil.


GAS MODEL NOSE (4) 1/16TH DIA DOWELS
1/8TH DOWEL
ARROW PARTS 1/32 ND SHEET
HAT BRIMS (2) 1/32ND SHEET
FUSELAGE TOP 1/32ND SHEET
COMMON PIN REAR PEG
BULKHEADS (2) 1/16TH SHEET
VERTICAL TAIL 1/32ND SHEET
DUMMY CYL. BLOCK BALSA
CUT OFF FOR GAS MODEL NOSE HERE
PILOT BODY 1/16TH SHEET
FRONT BOTTOM 1/16TH SHEET
FOUR INCH DIA. PLASTIC PROPELLER
7/8 INCH DIA. WHEELS
BALANCE POINT
FUSELAGE SIDES (2) 1/32ND SHEET
AFT BOTTOM 1/32ND SHEET
VENTRAL FIN 1/32ND SHEET
Tenderfoot Tom and his Flying Machine by Walt Mooney
PLANS AND THICKNESS CALLOUTS 1/2 SIZE
.020 GAS MODEL -- FULL SIZE FOR RUBBER POWER
W.E.M. 3-8-72

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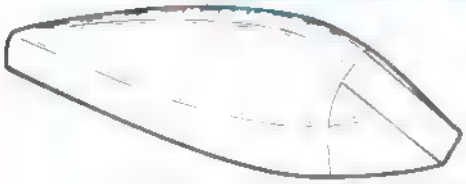

15"	$1.40
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9"	$ .75
7"	$ .45
5"	$ .30

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Give RC Pattern or CL Aerobatic models a distinctive touch with this type canopy.

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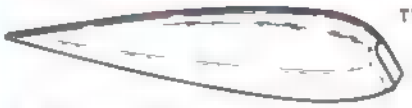
CHEEK COWLS



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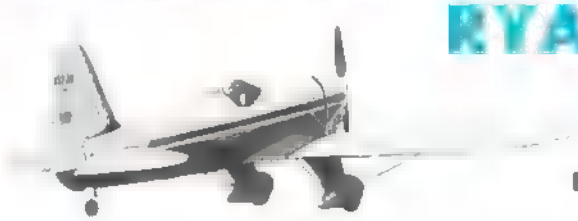
QUARTER MIDGET 6"

RACING 6½" long

CAN BE CEMENTED WITH SIG-MENT AND PAINTED WITH MODEL AIRPLANE DO

Maxey Hester's World-Famous RYAN STA



KIT RC-27
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FOR .60 ENGIN
WINGSPAN 72-

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C/L WW-1 SLOW COMBAT

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Huge 3-Color Decals
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Select SIG Balsa
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C/L WW-1 SLOW COMBAT

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ENGINES .19-.35

Designed by Kirk [illegible]

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Huge 3-Color Decals
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Plastic Canopy

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Molded Engi
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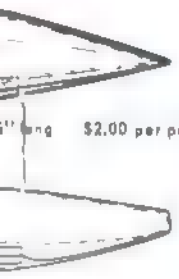
Stunt Flaps
Die-Cut SIG

TS AND SUPPLIES

SSORIES
PANTS

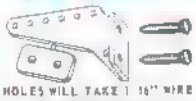


ng $2.00 per pair

$2.00 per pair

OPE OR ENAMEL

SIG CONTROL HORN



SHORT
MEDIUM
LARGE

HOLES WILL TAKE 1/16" WIRE

Pkg. of 2 - 80¢

PRECISION MOLDED OF TOP QUALITY NYLON
COMPLETE WITH NUT PLATE AND SCREWS

MOLDED NYLON HINGES

Pkg. of 16 - $1.25

Pkg. of 4 - 30¢

MOLDED FROM TEMPERED NYLON FOR MAXIMUM STRENGTH. THIN SECTION FOR EASY INSTALLATION. A SMALL AMOUNT OF EPOXY IN THE HOLES WILL SOLIDLY ANCHOR THE HINGE.

BANSHEE

NATIONALS WINNER

$9.95

WINGSPAN 49"
ENGINES .29-.40

5th Place 1971 Nationals Jr. Stunt
by Dan Osdoba

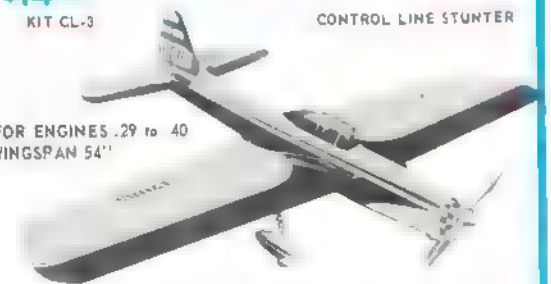
U/C PROFILE STUNTER WITH FLAPS

The BANSHEE was designed by Mike Stott to create a control line stunt model that would be easy to build, yet have flying qualities comparable to the best stunters. The BANSHEE has proven itself on both points. Very easy to build, it flies like the Nationals-winning Chipmunk. Docile enough for a beginner, yet the maneuverability to please the expert. A great addition to the Sig kit line.

SEMI-SCALE CHIPMUNK

$14.95
KIT CL-3

CONTROL LINE STUNTER



FOR ENGINES .29 to .40
WINGSPAN 54"

NATIONALS WINNER!

1st Place CL Precision Aerobatics in 1969 by Mike Stott
4th Place CL Precision Aerobatics in 1971 by Dave Osdoba

Fairchild PT-19

WINGSPAN 72"
FOR ENGINES .45 to .60

KIT RC-2
$41.95

FEATURED IN FULL COLOR ON THE COVER OF MARCH, 1969 MODEL AIRPLANE NEWS

The SIG kit of the Fairchild PT-19 is one of the classic RC scale kits. Beautiful, realistic scale flight that is an unforgetable thrill to witness. Big 72" Wingspan. Will take engines .45 to .60. Kit features a one-piece molded engine cowling, five sheets of detailed plans and instructions, six sheets of authentic decals, and die-cut balsa and plywood. A model you will really be proud of.

A BRAND NEW KIT OF AN OLD FAVORITE — PIPER J-3 CUB

FEATURING A ONE-PIECE WING

UNIQUE WING MOUNTING FEATURE
Puts No Stress on Cabin Structure

KIT RC-3
$23.95

THE PERFECT TRAINER

VERY STABLE AND EASY TO FLY
A NOVICE CAN SAFELY FLY THE [redacted]

- Shock-Mounted Wing Panels
- Authentic Decals
- Authentic Scale
- Fully Detailed
- Full-size Detailed Plans
- Die-Cut SIG Balsa and Plywood
- Molded Engine Cowling
- Die-cut Windshield

The J-3 Cub has long been our best selling R-C kit. The redesigned kit makes it better than ever. A unique wing mounting does not depend on the cabin structure for strength. In spite of the fact it is an accurate scale model, it is so stable that it makes an ideal trainer. Simple structure makes an easy-building model.

AN AUTHENTIC R-C SCALE MODEL of Hazel Sig's CLIPPED WING CUB

WINGSPAN 56"
LENGTH 42"
FOR ENGINES .19 — .35

KIT RC-26
$23.95

- Standard Balsa Construction
- Strong One-Piece Wing
- Molded Engine Cowling
- Authentic Decals
- Formed Landing Gear
- Full-Size Detailed Plans
- Aluminum Engine Mounts
- Die-Cut SIG Balsa and Plywood

The full-scale airplane is a Reed Clipped Wing Conversion, built up from a 1941 Piper J-3 Cub for Hazel Sigafoose, co-owner of Sig Mfg. Co. The airframe was completely rebuilt and 3½ feet removed from each wing panel. With a 75 hp. engine, the result is a highly aerobatic airplane that is really a joy to fly. With its blue and white sunburst paint job it is a great crowd pleaser.

A Beautiful Model of a Truly Outstanding Airplane

Send $1.00 Today for SIG'S BIG NEW CATALOG! The Model Builders' "Bible"

NO POSTAGE REQUIRED WHEN ORDERING CATALOG ALONE

THE 1972 SIG CATALOG is the greatest Model Airplane Catalog yet! Over 224 pages devoted exclusively to merchandise used in the building or flying of model airplanes. Features the complete Sig Line, plus practically all other lines available. Hundreds of models are illustrated including gliders, sailplanes, rubber-powered flying scale, control line stunt and scale, and every type of R-C model. Send $1.00 today for your copy or buy it from your local hobby dealer. You will agree it is the best bargain in the model airplane industry.

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SEE YOUR DEALER FIRST! If he will not supply you, then order directly from our plant. We will ship promptly. To Order, please add $1.00 for postage and handling in the U.S. Canadian orders please add $1.50. Minimum order is $1.00. Please remit by bank draft, check or money order. Print your name and address plainly. Sorry, No C.O.D. shipments. All prices subject to change without notice.

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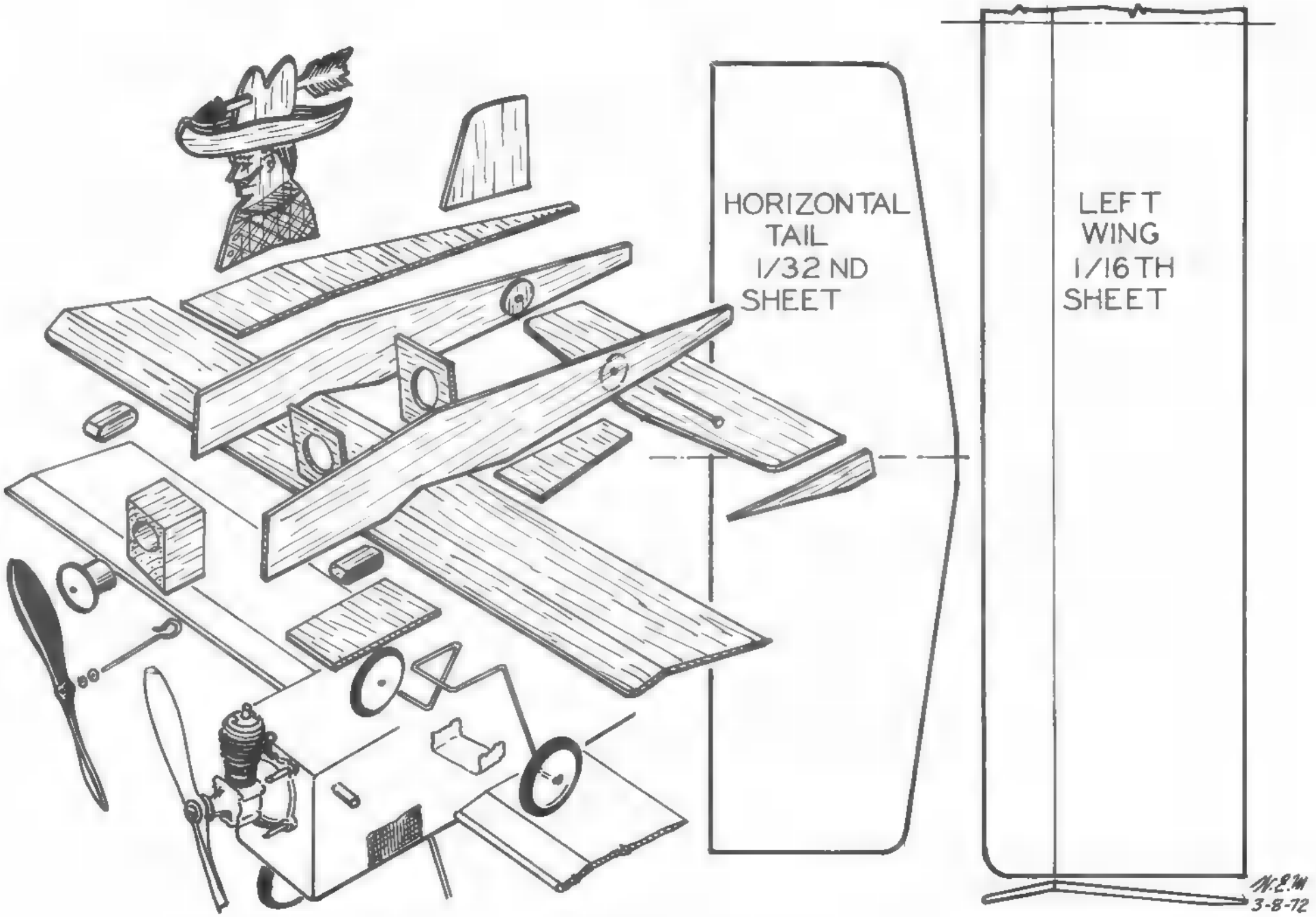
HORIZONTAL
TAIL
1/32 ND
SHEET
LEFT
WING
1/16 TH
SHEET
M.E.W
3-8-72

NEW!

RADIO CONTROL MODEL

No. 125

A.R.F. INJECTION MOLDED FOAM

Single Channel - .049 **Two Channel - .10** **Multi - .15 - .19**

FABULOUS SEMI SCALE CESSNA CARDINAL

48" WINGSPAN **List $21.95**

PERFECT FOR [redacted] A/C [redacted]

- Single Channel Radio, Rudder Only
- Single Channel Radio, Galloping Ghost
- Two Channels, Rudder and Elevator
- Three Channels; Rudder, Elevator, Engine Throttle
- Four Channels; Rudder, Elevator, Engine Throttle, and Ailerons
- Free Flight

[redacted] FEATURES

- One-piece molded Wing, high-lift
- One-piece molded Stabilizer
- One piece molded Vertical Fin
- Molded Fuselage, completely assembled with firewall, plywood floor, side rails, and main landing gear block already installed
- Complete plans, with step-by-step illustrations

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Hobart, Indiana

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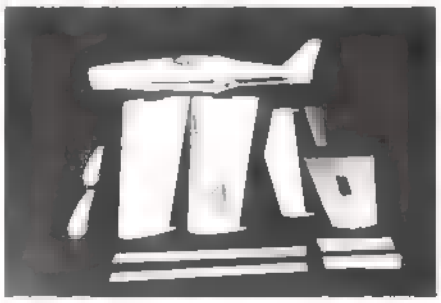
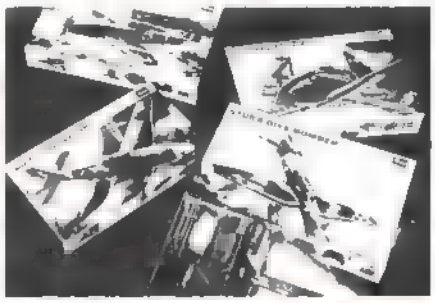
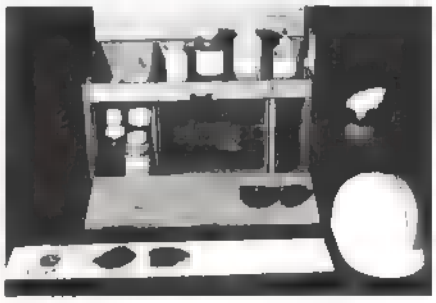
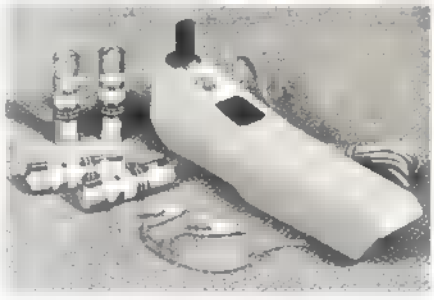
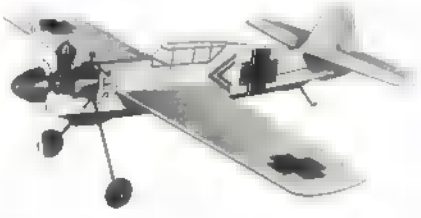
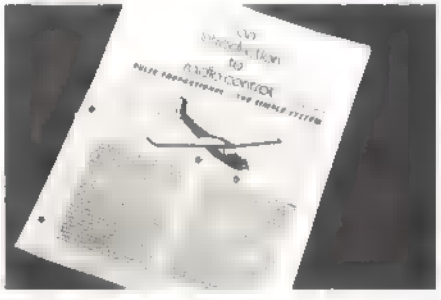












Pilot/Minnow. Beautiful Formula I aircraft with wheel pants, plastic covered, 49" span, 40" length, 461 sq. in. wing area, 8 lb. flying weight. .40 power recommended. $69.98. World Engines, 8960 Rossash Ave., Cincinnati, Ohio 45236

Edmund Scientific/New catalog. Just released, 150-page catalog covers over 400 items of interest to hobbyists and experimenters. Optics, electronics, weather balloons, helium, gyroscopes, shop tools, much more. A really one-of-a-kind source for the hard-to-find things which advanced hobbyists require. Ask for No. 722 catalog. Edmund Scientific, Edscorp Bldg., Barrington, N.J. 08007

ACE R/C/1972 Handbook-catalog. Advance copy of newest catalog is crammed with articles by pre-eminent experts in the field. Fred Marks on pulse-proportional systems, Owen Kampen on foam wings, Chris Soenksen on rudder-only flying techniques, stunt flying by Howard McEntee, RC airboats, designs, much more. Learn the Ace line and lots of skills in the bargain. $1.00. ACE R/C, Higginsville, Mo. 64037

Revell/WW II kits. Big, beautiful line of fighter aircraft in 1/32 scale. JU 87 Stuka, P47, RAF Mustang II, Mitsubishi "Raider." First three are old favorites with scale modelers, but Raiden (Japanese for Thunderbolt) is novel in kit form, beautiful radial-engined fighter which appeared late in war as interceptor bomber-killer. Revell Inc., Venice, Calif. 90291

Estes Industries/Launch control. Made of durable high-impact injection-molded plastic, launcher operates from four AA penlite batteries, is designed for use exclusively with the new line of Estes Solar Igniters. Up to 60 launches with one set of batteries, launcher features pre-assembled wiring harness, recessed launch button, continuity light. Fits easily into hand. $2.95 less batteries. Solar Igniters, 60 cents for pack of six. Estes Industries, Box 227, Penrose, Colo. 81240

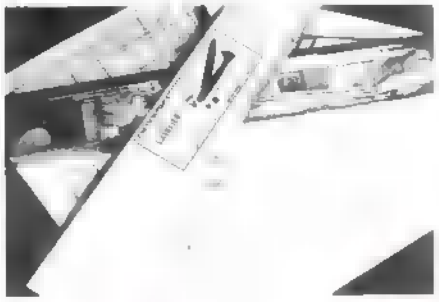
Aerospace Hobby/New CL kits. *Acro Sport* is first of new line of semi-scale profile CL sport planes. Model is all-balsa construction, styled after famous EAA home-built biplane. 18" span, kit uses machine-cut and partially sanded parts, plastic bellcrank and elevator horn, aluminum-hub rubber-tired wheels. $4.50. Aerospace Hobby, 559 1st Capitol, St. Charles, Mo. 63301

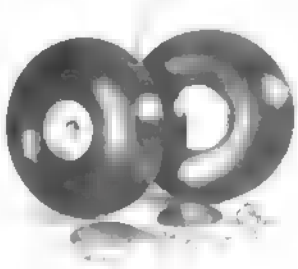
2000 Zulu/Field box. Quality field box in kit or ready-to-go version. You can store a gallon can of fuel, electric fuel pump, three transmitters, starting battery, miscellaneous hand tools (or your own choice of equal volume) into this well-thought-out 17-1/2 x 11-7/8 x 11-3/4" package. One large and nine small drawers, open rear and lockable forward compartments. Brass fittings, sealed 3/8" plywood construction, ready to finish in your own colors. Kit, $24.95; pre-built, $34.95; complete with legs, $39.95. 2000Zulu Model Products, 4330 W. Kennedy Blvd., Tampa, Fla. 33609

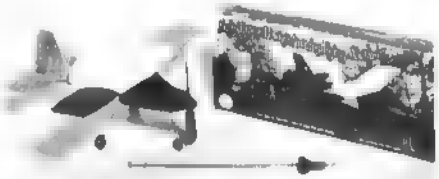
Midwest/1/2A control line series. Four models in this series, Bf-109, P39, P40, P51, each with 21" span, die-cut wood, formed wire gear, wheels, fuel-proof decals. Each kit uses identical ABS plastic "quick mount" motor mounts for full interchangeability between kits. Mount is held securely in place by only two screws. Kits priced at $3.95 ea. Midwest Products, 400 South Indiana St., Hobart, Ind. 46342

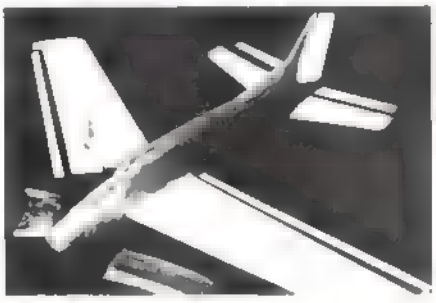
Tatone/Hinge slot cutter. Two-piece set consists of adjustable aluminum guide and specially-designed knife. Guide centers the hinge slot where you want to cut, anywhere from 1/8 to 1-1/4" in from upper surface. Hooked blade assists in removal of wood shavings from slot. "Hinge-It" costs $2.95. Tatone Products, 4719 Mission St., San Francisco, Calif. 94112

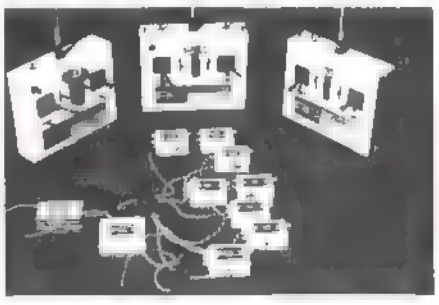
by FRANK PIERCE

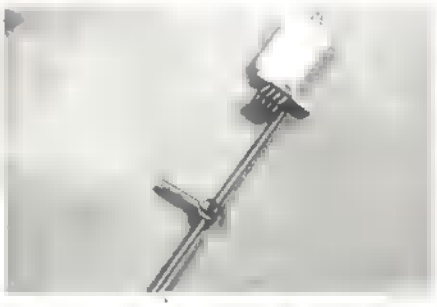


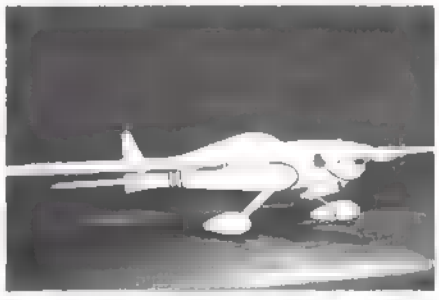












Testors/Shed-proof brushes. Shed-proof brushes can avoid bristles on an otherwise perfect paint finish. Instead of being bound by a shank at the top of the bristle, Testors uses double length bristles stapled in the middle to the base of the brush handle. Good quality nylon in three separate widths. Available in quantity from manufacturer, or at local hobby outlets. About 15 to 30 cents each. The Testor Corp., 11500 Tenn. Ave., Los Angeles, Calif. 90064

Kenner/Beginner's flying models. *Arrow Cruiser* is an almost-ready-to-fly kit which really should, even in the hands of youngsters. Colorful 20" span model has fully contoured fuselage, plastic and foam construction, "injector" rubber-band drive provides ROG capability and flights up to 50'. Spectacular flying for the kids, colorful packaging. About $3.25. Kenner Products Co., 912 Sycamore St., Cincinnati, Ohio

Model Products/Polystyrene model cement. New formula "NOTOX" glue, contains no toxic toluene or toluol, uses a citrus [illegible] a plastic solvent. Has strong "lemony" smell, more pleasant in confined areas than the mustard-oil-added plastic glues presently being marketed. Completely non-toxic. 1-oz. tube, 39 cents. Model Products Division, General Mills, 126 Groesbeck Highway, Mt. Clemens, Mich. 48043

Micro Models/*Cavalier.* Scaled down from the 1937 free-flight model, 36" kit can be built with either planked or stringer fuselage construction. Can be flown as either free-flight or single-channel configuration. All parts pre-cut and pre-packaged for easy building. Full-size plans and tissue included. Graceful high mid wing design, recommended for .020 and .049 power. $7.95. Stanton Hobby Shop Inc., 4734 N. Milwaukee Ave., Chicago, Ill. 60630

Pilot/*Phoenix.* Top of Pilot line, *Phoenix* has fiberglass fuselage, balsa-covered wings and tail surfaces, recesses already cut into bottom of wings for installation of retract gear. Plane is Don Lowe's design, for serious Pattern competition. $139.98. World Engines, 8960 Rossash Ave., Cincinnati, Ohio 45236

BK Products/Landing gears. Adjustable length nose gear uses allen head screw to set axle position with respect to aircraft fuselage. Positive clamp brass steering arm is unbreakable, gear strut is flattened to eliminate rotational slippage of axle. Solid nylon bearing block. $3.95. BK Model Products, 4765 E. Iliff, Denver, Colo. 80222

Tatone/Air wheels. "Flight Line" air wheels have scale-type appearance and will do good things to the looks of any non-military scale or near-scale model. Molded from neoprene low-bounce rubber, tires are thick walled and fuelproof. Tire and hub locked together to prevent separation during an occasional rough landing. Polished steel hubs with collars and retaining nuts. Quarter-inch increments from 2 to 3", from $2.69 to $3.39/pr. Tatone Products, 4719 Mission St., San Francisco, Calif. 94112

R/C Manufacturing/8-channel RC system comes standard with 5-channel transmitter, 6-channel receiver, 8-channel integrated circuit decoder with factory option to provide all eight channels in transmitter and receiver. Kraft KPS 11 type servos have dual linear outputs, with conversion parts for rotary system. Aileron extension cable for remote installation of aileron servo. 500 ma. NiCad power for both transmitter and airborne equipment, isolation transformer with dual output. 17 frequencies available on 27, 50, 72 MHz bands. 8-channel system, $410; $16.50 for buddy box cable and circuit. R/C Manufacturing, 7717 Fair Oaks Blvd., Carmichael, Calif. 95608

Airborne Associates/Hi-Lo. Mid-wing 60 powered RC competition or sport plane with wide cowl and realistic appearance with two wheel, tri-gear, or retracts. Plane is George Hill and Bob Scott design. Kit is all fiberglass including fuselage and Glaskin wing and stab. Can be completed and finished in less than two weeks of evening work. $99.50. Available exclusively from Royal Products Corp., 6710 East Evans Ave., Denver, Colo. 80222

Getting Started in RC

(Continued from page 12)

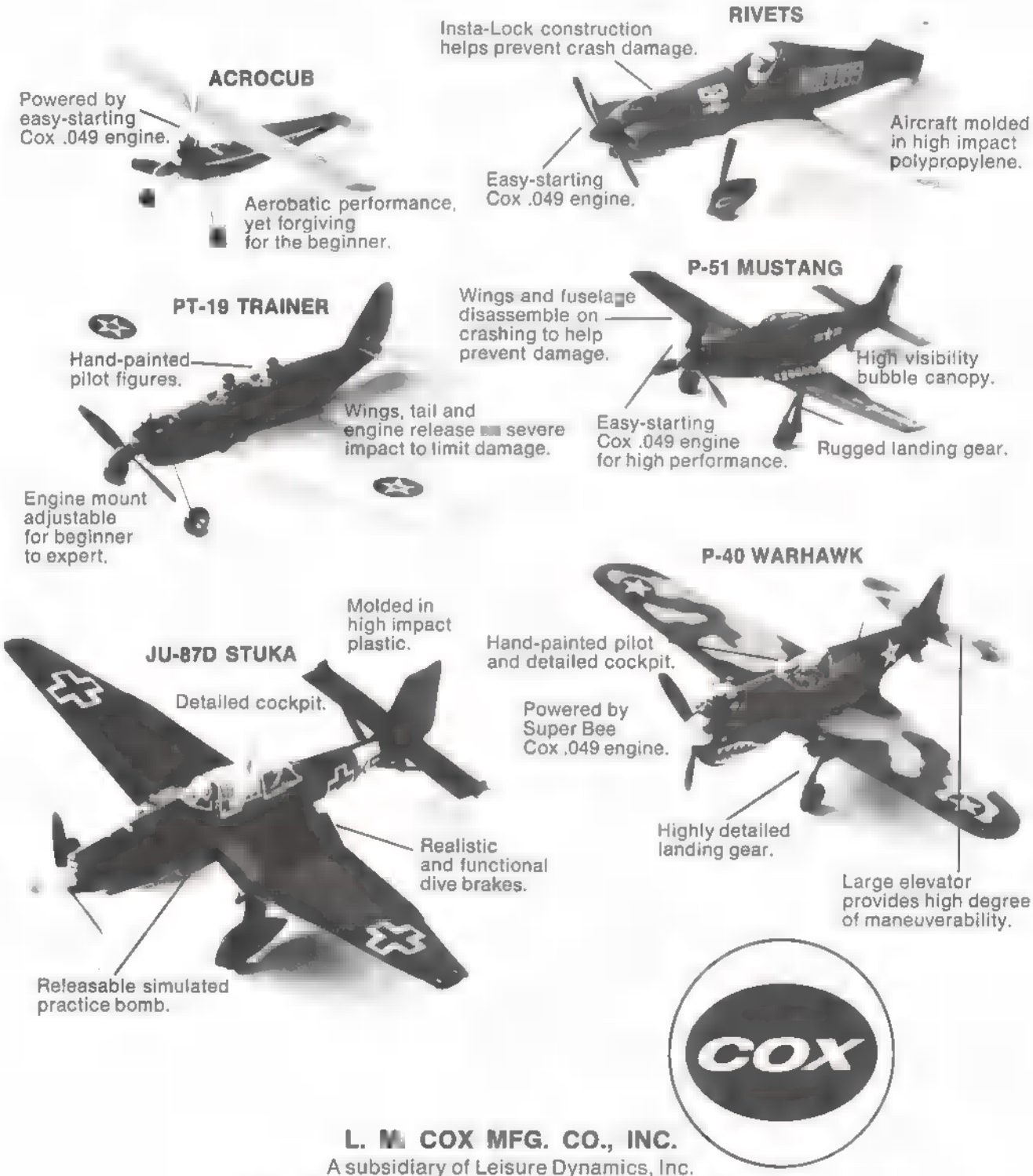
Get the best radio you can afford, not necessarily the most expensive. As in most other areas you generally get what you pay for. Beware of the big promotion bargain or the "package deal." Most are legitimate offers, but some are used to unload unsatisfactory or about-to-become-obsolete equipment. A knowledgeable modeler can help you evaluate these offers. It is possible at many hobby shops and supply houses to get a "package deal" on equipment of your choice. You can frequently request a package quotation, which is a considerable saving from the individual prices, by mail.

Try to find a local club, or at least an experienced modeler, to help you. If you are not a member of the Academy of Model Aeronautics, join. There are many good reasons for this. AMA annually provides a list of all member clubs. You get a competition rule book which is ▮ goldmine of information on all facets of aircraft modeling. You become covered by liability insurance as long as you abide by AMA safety rules. These are only a few reasons for joining. The others will become obvious after you join.

If you plan to operate ▮▮ RC system with an output over 100 milliwatts, you must also have a Class C Citizen's Band license or ▮ Technician, General or higher class Amateur License. The CB license can be obtained by filling out the proper Federal Communications Commission form and mailing it to the FCC office at Gettysburg, Pennsylvania. The fee is $20.00 and the license is good for five years. An Amateur or "HAM" license requires satisfactory completion of tests on theory, regulations, and Morse code reception and transmission. Full information on license requirements and study guides are provided in "The Radio Amateur's License Manual" for $1.00, published by The American Radio Relay League and available at most electronic hobby and parts dealers ▮▮ from the ARRL, Inc., Newington, Connecticut 06111.

In future articles we will discuss each of the above points in more detail, expand on the various features of aircraft, engines and radios which are suitable for various types of RC flying, explore installation and care of your equipment and how you and your gear can survive a crash—or crashes.

WANTED: MEN FOR OUR MAGNIFICENT FLYING MACHINES



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Send 25¢ for a full-color brochure of Cox gas-powered planes, cars, rockets and accessories. Address Dept. AA-7

.For Your R/C Flying Fun!.

commander '72

NEW CONCEPT IN PULSE RUDDER-ONLY

For 1972 the improved Commander has a Drain Brain switching arrangement in the receiver to reduce total battery drain and increase flying time from 50-80% per battery charge! Plugs are wired into the airborne unit which allows you to switch receiver from plane to plane with a minimum of effort. COMPLETE Flite Pak weights, including nicads, run from 2.5 to 4.8 oz. Transmitter has increased output to overcome interference.

Fully Proportional—Rudder follows directly movement of your stick.

Versatile—The same receiver and transmitter can be used with airplanes from 18-72" span.

Interchangeable—Plug-in wiring allows switching of receiver from plane to plane.

Lightest—Weights 2.5 to 4.8 oz. include Nicad batteries and oz. TOTAL weights.

Simple—Easy installation; actuator has only one moving part. Minimum maintenance.

Inexpensive—Initial cost of system, airplane and engine is low; nickel cadmium airborne pak and charger are included, transmitter and receiver can be used for many different planes.

COMMANDER '72 R-O SYSTEMS

Completely wired and tested, with transmitter, receiver, actuator, nicad battery airborne pack and charger, switch and connectors. Transmitter battery not furnished.

10G15—Baby System '72	$69.95
10G15T—Baby Twin System '72	$72.95
10G16—Standard System '72	$71.95
10G17—Stomper System '72	$74.95

26.995, 27.045, 27.095, 27.145, 27.195
Please Specify Frequency

ACTUATOR/BATTERY COMBOS

Here is what makes the '72 Commander so versatile. All you need to put in plane for extra installations. With connectors, you just plug in receiver.

15K15—Baby/225 ma Batt.	$11.95
15K15T—Baby Twin/225 ma Batt.	$14.95
15K16—Standard/500 ma Batt.	$13.95
15K17—Stomper/500 ma Batt.	$16.95

FLITE PAK WEIGHTS & RECOMMENDATIONS

Complete weight of each unit and suggested application:

Unit	Weight	Recommended
Baby	2.5 oz.	Pee Wee .020 Up to 48" gliders
Baby Twin	2.7 oz.	Tee Dee .010-.020 Up to 72" gliders
Standard	4.4 oz.	.049 to .10
Stomper	4.8 oz.	Tee Dee .049-.23

ACE MINI FOAM WINGS

These jobs are being used by many and more modelers to come up with their own designs. See recent issue of AAM for one and RCM for Mr. Mulligan. Ideal for 1/2A Racing--and other planes of semi-scale or fun types.

Constant chord measures 35" span, 5½" wide, area 192.5. Weighs 3+ ounces.

Taper section is 35" span, center 5½, which tapers to 4"; area 166.25. Just over 2 ounces.

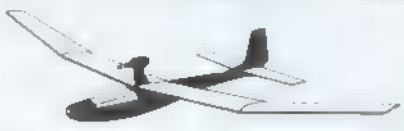
13L166—Ace Mini Foam Taper Wing	$2.95
13L192—Ace Mini Foam Constant Wing	$2.95

DICK'S DREAM KIT

Highly Recommended for Beginners

- 34" Foam Wing--Moulded sections
- Top grade die-cut wood parts
- For .020 engines
- Commander Baby or Baby Twin
- Owen Kampen design

No. 13L100—Dick's Dream Kit $6.95



ACE HIGH GLIDER KIT

- 70" Foam Wing -- Moulded sections
- Precision Machine cut and sanded wood
- For .049--Power Pod parts supplied
- Recommended for Rudder-Only Standard or Stomper Commander
- Owen Kampen design

No. 13L104—Ace High Glider Kit $14.95

SKAMPY KIT

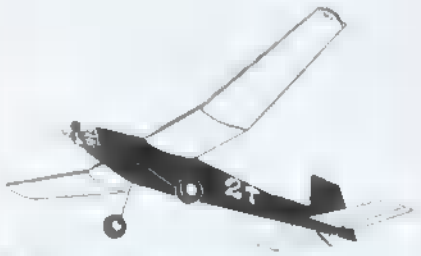
If you have mastered Rudder-Only pulse proportional flying, and are looking for new ventures, the Skampy is for you. Resembles a stand-off Goodyear Scale Racer. Owen Kampen touches in both the design and kit assures the experienced modeller of a satisfactory RO pulse experience. It is NOT recommended for beginners.

Has 30" span wing cut from Ace mini foam tapers. Construction of the fuselage is a bit harder than a box type, but still simple for modellers with experience. Fuselage is 23½", recommended power is Tee Dee .020. Recommended radio installation is Commander Baby Twin. This makes total weight of 12 to 13 oz.

Kit contains taper foam wing set, precision band sawed and sanded top grade balsa and hardwood parts. Bent landing gear, wire for torque rod and plastic bearing, and hinge material is also supplied. Wheels and engine mounting hardware not included.

Full step by step instructions make this a simple job for the experienced RO flyer.

No. 13L103—Skampy Foam Wing Airplane Kit $6.95



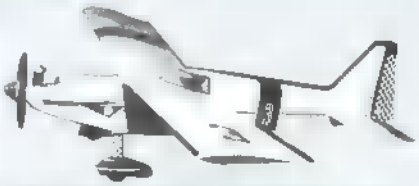
2T KIT By Ron Jacobsen

Uses two sections of the Ace Mini Foam Taper Wings, and one Constant Chord section for a total span of inches, 262 sq. in. Coupled with an .049, the 2T was designed primarily for the two channel Brick type digitals that are on the market, two servos of any digital system.

Also, when constructed correctly, it performs exceptionally well on Rudder Only using the Commander Standard or Stomper. Motor control be added to at a later date by using the KRD motor control.

Kit contains three wing panels, all balsa wood completely band sawed and precision sanded, bent landing gear, and miscellaneous parts. Is of the same general high caliber as previous Ace kits. Hardware for hinges and linkage and wheels is left to the buyer.

No. 13L106—2T Foam Wing Airplane Kit 14.75
No. 13L206—Three Foam Wing Sections For 2T 5.00



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Designed by Roman Bukolt

★★★★★★★★★★★★

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A Show Stopper at the Toledo Conference!

Plans were published in the July 1972 R/C Modeler.

The ALL STAR Bipe by Roman Bukolt is a real winner and will appeal to old timers and newcomers alike. Fashioned after [illegible] of the EAA home builts as well as the nostalgic planes of the 30's, this design overcomes most of the problems encountered in the building of bipe simple and easy construction of the N struts and cabane make this a cinch [illegible] build, and makes alignment a lead pipe cinch.

To get around the difficulty of building two [illegible] of wings, modified Ace Foam Taper [illegible] tions [illegible] used--again a simplification and [illegible] assurance of exact duplication.

Span is 34". Area 350 square inches. Designed for .049 to .15 power. Use with .15 and three channels, .09 .10 for two channel OR with .049 and Rudder Only Pulse! Truly an All Star. With 3 channels and a .15 this will out perform some of the big jobs. It isn't a 6 foot bomb--but don't tell this design short!

Kit contains 60 precision band sawed and sanded balsa, spruce and ply wood pieces, two sets of Ace taper foam wings, miscellaneous wire parts, and complete step by step building instructions. (Wheels and pilot [illegible] not supplied.)

This [illegible] highly pre-fabbed kit and meets the standards that have made the Ace airplane kits synonymous with TOP GRADE.

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ACE R/C INC.

HIGGINSVILLE, MO. 64037

Dear Friend:

The cartoon above by Dick McNeil expresses the sentiment of a lot of people, if sales here are any indication. We are selling twice as many Commanders now than we were at this same time last year. This says something!

You have [illegible] Dick McNeil's cartoons, since he has favored [illegible] with them for a number of years. Since he is an accomplished flyer, his comment relative to the Commander Pulse Proportional [illegible] most welcome. To receive an unsolicited testimonial this way is very heartwarming.

We get letters. We pride ourselves in the fact that [illegible] try to answer all of the questions that are asked--even to recommending a competitor's product when it will do a better job!

Unfortunately, some of the letters do not include a return mailing address, and the envelope (which we attach) also contains no clue of where to send the reply. This is very frustrating, because the person writing the letter has a very legitimate question, wants it answered, and then probably wonders why he is not getting it.

Right [illegible] we have a letter from a customer who is trying to make up his mind about starting on radio control. Says he has been advised by some flyers in his [illegible] not to start by way of pulse, because "pulse is too difficult".

To that we could add a bunch of exclamation points and a few other things.

Pulse, without a question, is the easiest way to learn to fly.

There is big revival in pulse. Not only are we getting letters from many digital flyers who are using them as second systems, but we are getting raves from 10 to 14 year olds who have built their first R/C plane, and flown successfully with a Commander R/C Pulse System. What more can you say?

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ACE R/C digital commander

As Presented in AMERICAN AIRCRAFT MODELER April, May, June, July 1972
By Fred M. Marks

- Two channel system using IC's and latest state of the art; may be expanded to [illegible] channel.
- Receiver-Decoder will work with ANY modern 4-6-8 channel digital transmitter on same frequency! Reads aileron and elevator signals--ignores the rest.
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- Receiver-Decoder offer inexpensive way to go with your present system for glider, plane, boat [illegible] car: use with extra servos you already have. Or use our combo flite pak: receiver-decoder, two servos, etc.
- At present available only on 27 mHz

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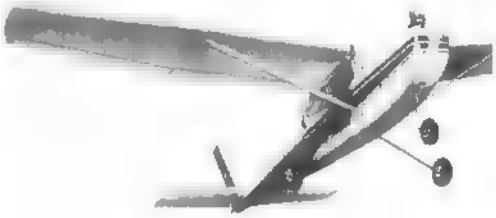

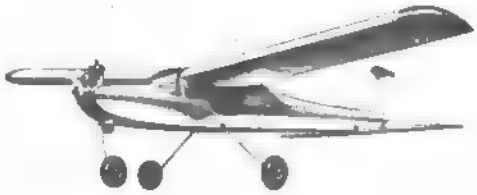

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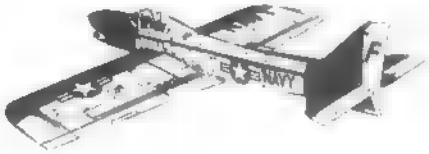

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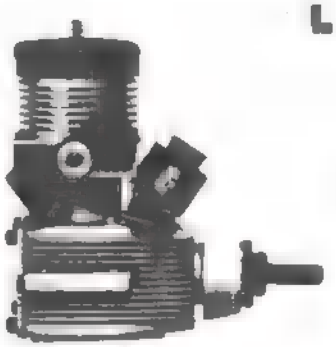

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Straight and Level

(Continued from page 8)

Through your mind there flash impressions of a motor tuning in from rich, of white sheet balsa and a keen cutting edge, of paper and silk being pulled over a wing frame and those wrinkles yielding as you quickly work. Or the feel of a soft brush, the smell of glues and cements, but especially of dope. The feel of wood to the hand. Speak of those things and there is a feeling of extrasensory perception. It is, really is, for the time just one world, thanks to this world of modeling. All are happy to be free, for the minute, of the God-awful crud which tinges our very lives. We seem to think the same

Van Kuzcilek of Poland launching winning Russian YAK 18 at Internats. (Saffek pic.)

things and know for a magic moment that we are alike underneath.

Now as the Hermes sputters on the approach, one hears the rush of wind over the wings, and anticipates the landing thump that is reality. Perhaps you will be one of the few to make an Internats. Others certainly will. For them, and for ourselves, we can at least always support team programs and our AMA which enables us to "be there" and others to share with us this great thing.

May your next flight be a relaxing one.

Bill Winter

Don't forget to scan through our long list of plans available through **SUDDEN SERVICE PLANS** on page 84 and 85. Send in for new plans today!

Wizrod

(continued from page 36)

dency to zero out. The Wizard wing airfoil was used with its free undercamber, which had proven superior to the old 10% flat-bottom of the Ramrod. We use the term "free undercamber" here because the Wizard and Wizrod wings are built as 8½-9% thick flat-bottom sections that gain 1-1½% of undercamber during building and doping due to the rib-over-spar type of construction.

In line with the lessons learned from the extended Ramrods, the Wizrod wing was also extended to the same degree as the Wizard, and the fuselage was also lengthened in accordance with the old formulas. But unlike either the Wizard or extended Ramrods, the stabilizer was extended, with an increase in aspect ratio, so as to maintain the 43%-of-wing-area relationship found in the original Ramrod.

With the exception of the new nose, which was designed around the rectangular Tee Dee 049 tank mount, construction is the same as in the Wizard, because it proved to have no weak spots and was generally simpler than the Ramrod.

The Wizrod magazine plans are one-fourth full size, so scale up accordingly. Better yet, send for the full-size plans (see page 84). Should you prefer to build the model in other than the ½A size, consult the accompanying table for areas and corresponding factors to use in converting the "350" dimensions. If working from mag plans rather than full-size ones, use the factor in the fourth column, rather than that in the third, to get your full-size dimensions.

Construction

Because the Wizrod fuselage is basically the profile type, it is simple to construct. Begin by cutting out one fuselage side from 1/16 x 3" medium balsa. Align the balsa behind the plan and mark the balsa by pushing a pin through the plan and into the 1/16" sheet. Besides the outline, make marks for the firewall and the longeron that goes under the pylon. Note that the firewall has a 10-degree downthrust angle built in. Duplicate the second side by using the first as a pattern. Pin the first side to your workbench (the plans are no longer needed) and add the longerons, followed by the diagonal crosspieces. All are 1/16 x ½". Be sure to eliminate the crosspiece under the front of the stab platform that would otherwise interfere with proper DT action. When dry, sand lightly to eliminate any unevenness between the longerons and crosspieces, then add the second side.

When dry, lift the fuselage from your workbench, block-sand the front to insure there will be no sidethrust and that it is flat, then cut out and add the firewall. The two-piece gear separator is then cemented directly to the firewall. Install the tank-mount on the firewall with 2-56 or 3-48 machine screws, using epoxy cement to glue the nuts to the rear of the firewall. Use care to insure that none of the epoxy gets on the screws. The 3/32" side cheeks are best

Author's model is bright red Jap tissue covered to help the timers and chase crew keep it in sight. This plane is for the trophy hound!

cut out were the fuselage sides. Mark one of them for the Tick-Off timer, using the left or right, depending on your preference. After the timer hole is cut, glue 1/16 x 3/8" pieces to the inside of the cheek to make a box for the timer. The 1/16 x 3/8" balsa needed to separate the cheeks from the fuselage is best cut from 1/16" sheet, the grain of the wood being cross-wise to accommodate the curves. Cement this material to each cheek only after it has been carefully cut, assembled, and sanded to proper size. Finally, the cheek assemblies are cemented to the sides and firewall. (An alternate procedure here is to glue the cheeks to the firewall and then add the curved 3/8" wide pieces to fit.) Now add the 1/32" plywood Tick-Off timer mount. Cement the tail platform and stop block to the rear of the fuselage, and add the 1/32" U-shaped piano wire to the bottom for a tailhook.

Cut out and assemble the 3/16" medium sheet balsa pylon, and add the platform, hooks and gauze. Shape and sand, but do not assemble the pylon to the fuselage at this point.

The Wizrod wing offers nothing unusual or new—just the typical rib-over-spar construction. Accordingly, only a few construction hints will be provided here. The rib-to-spar fit should be snug, but not forced. Ribs that are too loose may result in a wing with excessive undercamber, while force-fit ribs might cause a convex rather than a concave lower surface, which would degrade performance considerably. The two center ribs, in order to accommodate the 1/16" planking, need to have their top cambers reduced by 1/16". The 1/16" square false rib support glued to the bottom rear of the leading edge should be immediately cleaned of any cement fillet which might squeeze up, in order that the false ribs added later will fit properly and not be held up. This is easily accomplished, as each strip is put in place, with a square-ended piece of scrap balsa.

Making a main rib template or pattern out of thin aluminum (or plywood, as a second choice) will be a useful tool in cutting out both the ribs and false ribs. To make the different-sized wingtip ribs, first lay out the correct length and spar locations for each rib. Then place the main rib pattern on the balsa, with the leading edges together, and lower the pattern's trailing edge until an arc drawn across the top camber will in-

tersect a point 1/8" higher than the lower camber at the end of the rib. Draw the arc across the top camber or, if using a metal template, cut the rib directly. The correct spar depths are most easily figured by marking, on the already-cut spars, the places where the ribs will intersect, laying the spar upon the rib in such a way that the point on each where the eventual joint will be made come together, and making a mark for the top of the spar. The corresponding rib for the opposite wing half can then be duplicated from the first one made in this way.

Begin the stabilizer by pinning down—over a piece of waxed paper, of course—the leading edge, notched trailing edge, and bottom cap strips of 1/16 x 1/8". Next add the single large piece of 1/16" sheet at the center of the leading edge (which extends into both right and left halves of the stabilizer, with wood grain spanwise), followed by the two full ribs. Since the fin, dorsal fin, and plywood rubber band hook are later cemented between these two ribs, it is a good idea to make sure they are separated from each other by inserting scrap 1/16" sheet between them while the glue is drying. Next add the two small pieces of 1/16" sheet at the center of the leading edge, noting that the grain should run fore and aft, as opposed to that for the single piece underneath them. The two gussets of scrap 1/8" sheet are now added, as are the 1/16" square rib separator at the leading edge (clean off excess glue, as was done for the wing), and the spars. Scrap 1/16" sheet is used on the spars at the center to increase strength.

At this point only the top cap strips are lacking; before they are cut and glued in place, all joints must be permitted to dry, then the leading edge unpinned and shimmed up 1/32" with scrap balsa, and then repinned. This will help insure that the stabilizer's bottom surface is slightly convex- a condition required for good longitudinal stability (the ability to recover from a stall quickly). Add the fin, dorsal fin, and rubber band hooks only after the stab is covered, but before it is doped.

Once the model is complete except for the pylon being glued to the fuselage, assemble the ship and locate the CG. The chances are good that the pylon will have to be further aft than shown on the plans in order for the CG to be in the proper place. Assuming this to be the case, slide the pylon back on the fuselage until the CG does fall in the proper place in relation to the wing and then cement it to the fuselage at this point.

Next, check for wing and stabilizer warps by sighting along the bottom of the surfaces. Ideally, the stab should be flat, but a little twist won't hurt anything. The wing should be warped noticeably but not excessively for a left turn. It does not matter whether the left panels are washed out, the right panels washed in, or if all the twist is in the center section. Just insure that the left-turn warp is somewhere present in the

(Continued on page 74)

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Wizrod

(continued from page 72)

wing by steaming or holding it over an electric range at low heat and twisting the surface in the desired direction. Overwarp by about 100%, as there will be a significant return.

Visually check the model to make sure there is no engine sidethrust. Slight rightthrust is tolerable, but any leftthrust should be eliminated by placing washers behind the left side of the tank mount. When the back of the tail is keyed to the stab platform with a piece of 1/8 x 1/4" scrap balsa on each side, there should be a slight fin offset to the left. The plywood rubber band hook at the front acts not only a key, but also a DT limiter. To achieve the latter function, cut the slot needed to pass the hook through the stab platform a little long in the direction of the tail. The longer this slot, the greater the DT angle, which should be about 45 degrees. Finally, shim up the left side of the stab platform 1/32" to 1/16" to induce a left-hand glide circle.

Flying

After the surfaces have been allowed to cure out for about one week after the final bout with the tea kettle or stove, take the model and some shim balsa to the field and toss your new Wizrod around a bit. If you have eyeballed the stab tilt well, the only thing left is to see if an incidence change is needed to achieve a normal gliding attitude. After you have verified glide circle and incidence, and have gotten the feel of the model, try a few test glides with succeedingly more zip, being sure the left wing is low to avoid a stall. In this way there is little possibility of having the model act up after fueling off on the first power flight. Besides, it gives one a little HLG practice.

Make the first test flight with a short engine run, the prop on backwards, and the engine running rich. There should be a definite nosing-up tendency and a shallow (15-30 degree) right bank. If not, make the needed adjustment and try again. In any event, you should have your new Wizrod full bore and right in the groove by the third or fourth flight. . .we wish you well.

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.15	550	1.25	5.00
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Quikie

(continued from page 40)

because of variety and builders' preference. A Pylon brand RST 12 nylon tank, or ■ tank similar in cross section, must be used. This is because the tank hole ■ F-2 provides access to the battery compartment and ■■ of a smaller tank hole would make ■ Chinese puzzle out of battery installation. Four cell Pro-Line, EK type flat battery packs will fit in easily with ■ ¼" to ½" of foam rubber wrapped around them. What I have done is traded ■■ access hatch for more strength. It's worth it. It will be necessary to bevel the sides of ■ 60-sized Tatone mount at a slight angle to give 1/16" clearance from the cowl sides. An alternate method would be to widen F-1 to give the desired clearance. If you like, conventional bar mounts may be used, but keep the nose gear on the front side of F-1.

They say that if you've built one foam wing you've built them all. The only difference here is the deletion of dihedral braces. The gear block shown on the plan is the one I use; however, a commercial one may be used. After joining the wing halves with epoxy, shim one panel 3/4" at the tip. Glass the center section and line the servo cutout with 1/16" balsa. Do not install the wood dowel or fairing block at this time. Important: be sure the main gear ■ located in the position shown on the plan.

For the empennage we have used a Taurus type stab. Use Titebond throughout; cut the key way after completion. Do not cover at this time. Cut the rudder from ¼" hard balsa and do not omit the dorsal fin.

All the fuselage balsa is lightweight medium grade. Assemble the fuselage in the following sequence. Mount the Tatone engine bearer (be sure it is the type that will take a Du Bro or BK nose gear) on F-1 using 6-32 socket head bolts and blind nuts, making sure it is square and the tops of the engine bearers are at the horizontal reference line on F-1. Stand F-1 upside down on a flat surface and slide the fuel tank (also inverted) against the back side of F-1. Mark the fuel and vent line positions and drill through F-1 and the engine bearer from the back side. Slip a Top Flite bearing block on the nose gear and about one in. of medium size surgical tubing. Lubricate if necessary and slide this unit into the engine mount. The thickness of F-1A can now be determined. Epoxy F-1A in position and, using the bearing block as a guide, drill right through F-1. Mount the bearing block with 4-40 screws and blind nuts. Cut all bolts flush with the back of F-1 so they can't puncture the tank or battery pack. Now remove the nose gear and engine mount.

I've seen many modelers lavish a great deal of time and effort building straight wings, only to nullify this effort by mating the wing to ■ crooked fuselage. If this sounds familiar, try building

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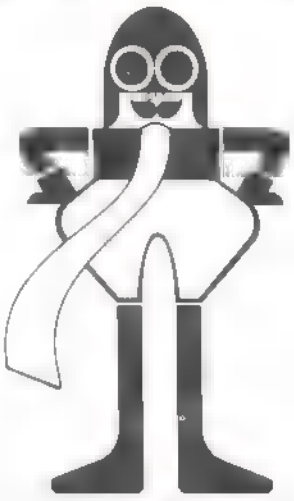

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3. **all rubber band models**
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Quikie

(continued from page 76)

the fuselage the following way.

The top edge of the fuselage sides is ■ straight line parallel to the centerline. It may be used as the reference line for all incidence and thrust. If so, its straightness must be maintained throughout fuselage construction.

After cutting the forward doublers, mark the bulkhead locations being certain F-1 is 90 degrees to the reference line. Lay the fuselage sides on a flat surface and contact cement the doublers, filler strips and longitudinal triangular braces in place. Be careful not to get contact cement on any surface that will mate with the top block (epoxy over contact cement equals a bad joint). Cut the top braces to receive F-2 and F-3, five minute epoxy at a 90 degree angle to one side. When cured, add the other side. Install F-1 with Hobbypoxy Formula 2. If construction has been accurate to this point, F-1 will align itself when pushed against the braces. Epoxy in the cowl and bottom blocks, and chop off everything that doesn't look like the Quikie.

As there is no nose ring, the engine and Tatone mount can easily and best be installed as a unit. Make sure the inside of the cowl is shaped so an allen wrench can reach the bottom 6/32 bolts from the front. Mark the *exact* center of F-1 and F-3. Invert the fuselage on the overhead plan view with bulkhead center marks on the centerline. Tapering the braces as necessary, join the tail with epoxy on the centerline. Glue in F-4, grain crosswise. At this point, check for twisting and square the aft end up before the epoxy cures. Epoxy in all remaining vertical and crosswise triangular bracing.

Now is the time to install all linkage. If you are going to use the steering linkage described above, the end of the Nyrod tube should be located one in. directly behind and in line with the hole in the steering arm that will receive the linkage. Experience has shown that heavy side loads are applied to the end of the Nyrod should the steering arm swing in toward the fuselage centerline. It is necessary to dig out a rough depression 1/8" around and under the Nyrod end in the bottom block, filling this area with epoxy and building it up over the Nyrod, forming ■ fillet. This "footing" helps prevent the Nyrod from being torn out of the block. Both rubber band and bolt wing hold-down methods are shown on the plan. If you are using rubber bands, delete the additional 1/16" doublers at F-3 and the 5/16" dowl. For bolt-on wings, align the wing in the saddle, locate the dowel position through the hole in F-2 and install ¼"-20 wing hold-downs (Tatone are shown). The fillets are compatible with

(continued on page 113)

Don't forget to scan through our long list of plans available through **SUDDEN SERVICE PLANS** on page 84 and 85. Send in for new plans today!

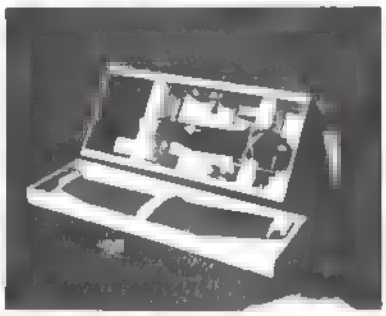
Jet Set Modeler

(continued from page 29)

This brainstorm worked fine, except for one thing: it got so heavy it was rather hard to lift. It also wouldn't fit in my car, so I had to get a friend with a truck to take it to and from the airport. The largest factor contributing to the weight was the hardboard which had been used for the sides. The next one will be from plywood, as are most of those in the photographs. Notice, too, the various ways of bracing the planes inside. After looking at many such boxes at the Nationals, I think the styrofoam and foam rubber method used by Joe Bridi is about the best—as well as the easiest to accomplish.

With your homemade model case complete, some lettering should be added to the sides to indicate what it contains. By telling those who will be handling your model what it is, you will ensure that it receives the extra care you would give it if you were loading it yourself.

Having foregone the energy- and time-consuming chore of driving, we began the pleasures of the trip about two thousand miles before arriving at our destination. After leaving that luxurious 747, collecting our planes, and making our way to the motel, the scene was reminiscent of the big class reunion. Old acquaintances were renewed, and new ones begun. This being my first major contest in many years most faces were new to me, except for those so frequently seen in the magazines. All of these people were warm and friendly, and they quickly made the newcomer feel that he belonged.



Joe Bridi's pylon racer uses two boxes. Baggage handling is much easier this way. Note shaped styrofoam blocks hold model, and transmitter is also inside.

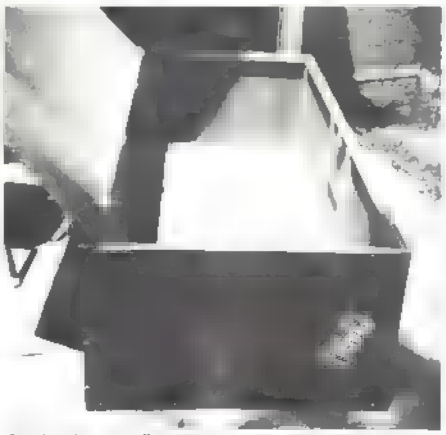
A control-line stunter requires box to house this p plane. Note bracing also holds the model.

Since my flying in the NATS was not to take place until the last day, my week was spent helping Joe Bridi, and getting to know some of the modelers. Evenings were spent getting involved in the many social get-togethers which are almost always found in contest land. I really don't think I have enjoyed any modeling activity more than the time I spent with these great people.

When my turn to fly finally came, I was disappointed to learn that Class A would have only three flights total. The first flight went out the window with a blown plug. (At least I landed in the circle!) The second and third flights were really terrible: my rather limited flying ability was doing a miserable job of fighting that heavy crosswind. I discovered later that my poor flying ability was not the only cause for such a poor showing. While packing my planes back in their box, it was revealed that two of the four ball bearings used to hinge the ailerons (the ultimate setup?), had completely collapsed. This provided about 1/2" slop in the linkage, which left very little travel to control the airplane. I was lucky to still have it.

The flight home was rather quiet for us, because we were unable to ride with the others. We were standby and the coach section of that giant 747 was full, so we had to go First Class. Did I say had to go First Class?

Everyone in our group, and the many modelers I spoke to who had arrived at Glenview by air, felt that the entire affair was an unqualified success. I would like to take this opportunity to invite everyone to join us for the California-Hawaii Summer Fun Fly. The date is set for June 24 through July 1. Events will include Formula I Pylon, Sport Pylon, A, B, CN and CX Pattern. The site is an old airfield in Honolulu, Hawaii. We have arranged for a special package rate for the trip, and I am sure you will find it very attractive. This is also the golden opportunity for beginners and experts alike to participate in an event which will prove to your wives that your modeling hobby can provide them with a great deal of enjoyment as well. This promises to be the contest of the year, so don't miss it. Write to Joe Bridi, c/o Hawaiian Holidays, 1721 N. Highland Ave., Suite H, Hollywood, Calif. 90028 for full information. See you in the land of enchantment—aloha!



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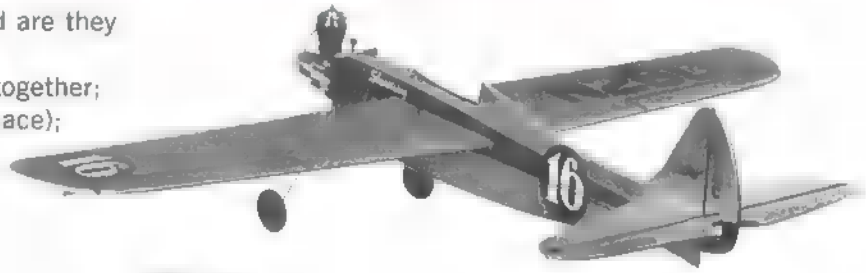

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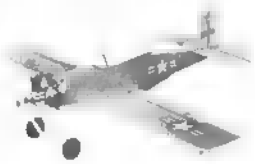

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AAM Commander

(continued from page 51)

servo potentiometers, the center terminal, and the wiper require a very thin coat of silicon grease which will be available from ACE R/C. Servo noise may be encountered after a few flights if this grease is not applied.

In case of difficulty, the procedure for this or any system is as follows: (a) First, always check battery voltages. (b) Localize the problem; determine if the transmitter is radiating and the pulse train is present (using an audio monitor or an FM receiver). The audio hum may be heard on an FM set at around 108 MHz. When the control stick is moved in either direction, the "buzz" should change tone. (c) If, say, one servo is dead but one is good, swap servos. If the servo was bad, it won't work on the "good" channel. If the "good" servo quits, then there is a problem with the transmitter encoder or the decoder. (d) Almost any servo problem can be traced to either of the following: ■ mistake was made in assembly, or the IC is bad. So far, 40 have been assembled and there have been no bad IC's. (e) If the problem is a servo, recheck the assembly for errors. If none is found, replace the IC. One word of caution: reversal of polarity to the servo or shorting the servo output to ground (no matter how short the time) will ruin the IC. Of the forty built, I connected one of the eight or so I built backward and it worked fine—after I connected the power leads correctly and replaced the IC! (f) If the problem is not a simple battery problem, ■ servo, or assembly error, then it is desirable to have access to a scope for further trouble-shooting although a VTVM may be used to check those voltages. A table of these voltages is available in the fully-detailed instructions from ACE R/C. Due to space limitations, the table is not shown with this text.

The sequential scope trace photos pretty well tell the whole story. The shape of the proper signal is evident and the amplitude and period are noted. Probable difficulty if the proper waveform is not present is noted. The numbered sequence begins with the transmitter master clock and proceeds through the encoder, the modulator and the RF sections. Proper RF output power can be determined with a field strength meter or by demodulating the RF wave and checking it on ■ scope or VTVM as described in Part II.

Starting with Trace Number 7, the receiver can be checked. One trace which is not shown may be checked on ■ scope having a sensitivity of .0025 volts cm, if available, that being the local oscillator output which is a simple sine wave. The shape of the IF waveform at various stages is much like that of Trace Number 8, but the amplitude is considerably less—so don't fret if it can't be seen on a scope with low sensitivity.

(continued on page 86)

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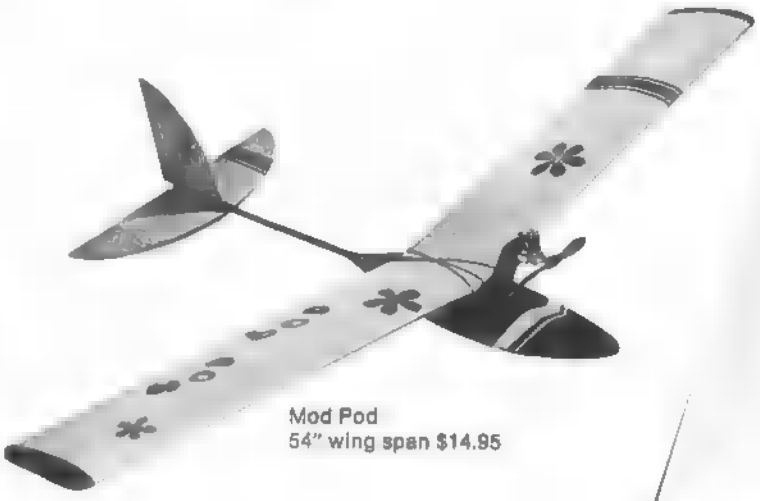

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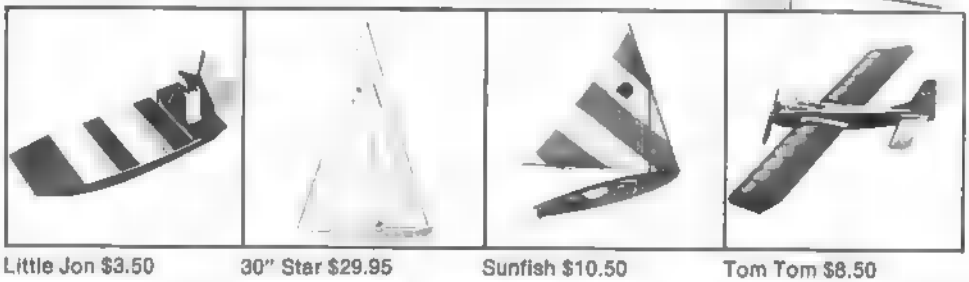

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No. 1212, Brooklyn Dodger—Sal Taibi's great old-timer FF job presented as it was by Bob Harrah. For ignition 23-35 or smaller glow engine. $1.75

No. 1213, Canus—Sixty-powered and large-size FAI aerobatic RC plane. Very quick building. $4.00

No. 0125, Firecracker—FAI scale RC pylon [illegible] with special fast airfoil and homemade retracts (in text), a winner by Bob Root. $3.50

[illegible] PLAN SERVICE
733 Fifteenth St., N.W.
Washington, D.C. [illegible]

Please send the following plans by First Class mail, at no extra charge. I enclose $_____ for payment.
For foreign orders please add 25% for postage.

Name _____

Address _____

City _____ *State* _____ *Zip* _____

PLAN NO.	COST
# _____	$ _____
# _____	$ _____
# _____	$ _____
# _____	$ _____
# _____	$ _____
# _____	$ _____

Total: [illegible]

No. 0121, Penguin—Unusual scale CL flying model of post-WWI pre-flight trainer. Simple and RC-able. Uses 19 [illegible] 35 engine. 3-views on plan. $2.50

No. 0122, Pay-Up—TeeDee 020-powered AMA Pay Load event winner [illegible] nice for sport FF. Simple [illegible] sturdy. $1.50

No. 0123, Nifty Novice—049 thru 15 power for monoplane [illegible] biplane Tenderfoot CL trainer. With power, bipe [illegible] stuntable. SPECIAL PRICE $1.00. decal included.

No. 0124, P-38—Semi-scale WWII fighter with single 049 flies rudder-only pulse RC with ACE mini-foam wings, others usable. $1.25

No. 0221, Big Flapper—Large high wing [illegible] docile flyer for a 60 engine and 4 channels. Nice trainer/sport plane. $3.50

No. 0222, BV-170—Three 35's power this sort-of-scale German profile fighter. It is big, pulls hard in flight, stunts too. $4.75

No. 0223, Canard Drop-Off—Rubber pusher sport flyer drops its prop and rubber when unwound, then drops a piggy-back glider. All balsa and flies great. $2.00

No. 0224, Cardinal—Excellent FAI European-type RC pattern plane of foam/balsa construction. Up-to-date ship if for 60's, suitable for retracts. $4.50

[illegible] **0321, Turbo-Pilatus Porter**—Fine flying CO2 or Rubber powered FF scale model and scale floats for ROW. All on one plan. $1.50

No. 0322, Little Bird—Midwing RC pattern plane handles wide range of power up to 71's, yet is small in size. $3.50

No. 0323, Two For the Show—Biplane CL stunt for 049 [illegible] [illegible]e. This one offers precision flying in small [illegible] great for practice. $1.50

No. 0324, 2T—ACE-foam-winged RC trainer for 049 power carries 2-channel bricks with ease. Ample wing area for long glides too. $2.00

No. 0421, Quarter Pint—A 020-powered Tenderfoot free flight patterned after an antique design of 30 years [illegible]. With decal. $2

No. 0422, RCX4—Bat-like winged sport RC plane for big motors, 4-channels, and crowd pleasing flights. $4.50

No. 0423, Squeeze-Banger—FAI combat anyone? Fast flying 15 ship from Canada is a winner. $2

No. 0424, Dragonette—Compact version of Kraft's Dragon Fly uses hot 40 and flies just like a big one—fast and smooth. [illegible]

No. 0521, Satellite 1000—Huge and highly-detailed plans for one of FF's [illegible] winning designs. For screaming 40's. $3.50

No. 0522, Lil' Rebel—Fast and very durable 15 Goodyear CL racer [illegible] a consistent winner. $2.25

No. 0523, Pegasus—A take-apart RC job designed for transportation in its own box. Full house with a 19, stunts well. $2.50

No. 0621, Su-Long—miniaturized Old-Timer [illegible] 020 power event and sport flying. Easy to make. $1.50

No. 0622, Denight Special—Well updated four-year-old Forum 1 racer by deHolt has many unique features for speed. All balsa construction. Two-sheet plans. $2.00

No. 0623, Chance Vought "Skimmer"—U.S. Navy experimental shipboard fighter is real flying saucer. For profile carrier events, by Frank Scott. $4.50

THIS MONTH'S PLANS

No. 0721, Douglas Devastator—Navy Carrier competitor for 40 or 60 of colorful shipboard fighter. A tough plane and a winner. $3.00

No. 0722, Wizrod 350—Ron St. Jean's combination of past FF power winners in a 350 sq. in. 049 screamer. $1.75

[illegible] **0723, Quickie** [illegible] 4—RC competitor for Class A and B. Conventional looking low winger flies easily, builds very fast. $2.00

ATTENTION! If you're getting ready for your club competition and find that you need those extra awards, drop us a line and we will send along at least one Plan Service Gift Certificate worth up to $10.00 in plans. All that we ask is recognition as a co-sponser to your meet. AMERICAN AIRCRAFT MODELER

AAM Commander

(continued from page 82)

Traces are not provided for the servos as they are rather meaningless. Problems with servos are almost certainly one of the two things listed.

For those who do have a scope, problems can be localized to some extent by checking the voltages using a VTVM having an input impedance of 10,000 ohms per volt or more. However, localization is much easier using the scope.

Using Parts of the System With Other Sets

This system was purposely created to permit its use with other systems. The servo has been found compatible with the ORBIT IC decoder made prior to 1972 and with a Heathkit SCS decoder. (No other decoders have been checked.) If anyone chooses to try it with any other decoders, please let us know your results. The receiver-decoder will operate satisfactorily with any transmitter as long as they are on the same frequency and the receiver is tuned to that transmitter. This is one of the major applications envisioned. The owner of an existing multi-channel set may build an AAM Commander airborne pack and use it to run cars or boats or fly a glider or sport plane. If this is the case, simply center the servos by rotating the feedback pot elements with the transmitter control and trim

centered until the servo output is centered. Do not reset the transmitter used because that will change the centering of servos for the existing system.

The builder may wish to use existing, extra servos with the receiver decoder. The list of those actually checked is included in Part II and is lengthy, including servos that require a negative-going control pulse. The transmitter is rather limited; it will operate a one- or two-channel receiver system (except for the Kraft KP-2B or the Jerobee receiver which do not [illegible] the normal digital concept) and will provide two channels out of decoders designed for more than two channels. The outputs will not necessarily appear at the first two decoder channels and may appear more than once depending on decoder design. (However, this is stated to preclude having to answer a letter to anyone who is almost certain to ask!)

Plans for System Expansion

Reaction to the AAM Commander has been quite gratifying. The most frequent suggestions have been that it is desirable to have the system for 72 MHz. A pulse-omission detector add-on is needed for throttle. (Surprisingly, many people have suggested this item for use on two- or three-channel sets other than the AAM Commander or for flaps or retract gear. Some have suggested the expansion to permit operation of four or more channels—everyone with his own idea of how many.

In line with these suggestions and our own original plans, the items which follow will be pursued and presented as they are completely tested (most are at an advanced stage now). They are listed in the order in which we hope to present them.

A new decoder based on an eight-bit shift register has been built and tested. This decoder will interface with transmitters from one to eight channels. This new design is made possible by a drop in price of the shift register required from $12.70 to around $4.00 in small quantities. We actually had one of these going about two years ago but didn't feel that the home builder would accept paying $12.70 for an IC. If the price had been lower, it would have been used instead of the decoder we designed for two channels. This decoder also can potentially replace the decoder for many existing receivers.

To operate the coming eight-channel IC shift register decoder we will present an eight-channel encoder for the transmitter. Interestingly, this encoder design will use the [illegible] IC chip [illegible] in the decoder. Of course one may choose to build it using only two channels at first, or three, [illegible] four, or six. One need only add a control pot and lever per channel and appropriate wiring at the airborne end of the system.

A pulse omission detector-servo will be designed to operate in parallel with any digital channel. This works [illegible] follows: a servo receives new information at about 40-60 times per second. A Pulse Omission Detector (POD) will be built into a servo mechanism, such [illegible] the D and R Bantam, modified to permit rotation through 360 degrees. The POD will sense the presence of the control pulses to a selected decoder output, e.g., throttle via a plug in parallel with the existing digital servo. By interrupting the encoder pulse train for [illegible] little as 0.25 sec at the transmitter, the POD will activate the auxiliary servo to start it on to a new position. If throttle is desired, limit switching will be provided for, say, three positions. Two positions will suffice for retract gear. The actuation of the POD occurs so quickly, no difference in flight attitude occurs and it does provide an effective, added channel.

We recognize that it is a bit unfair to recommend nickel cadmium batteries without presenting the changes the builder needs, [illegible] an external, transformer isolated battery charger will be presented. This [illegible] a rather simple chore requiring a transformer, two diodes, indicator lamps and charge-adjust resistors.

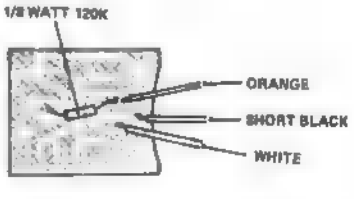
The home builder is not permitted to construct on the 72 MHz band, however, as soon as the necessary FCC regulations can be determined and satisfied, the receiver will probably be made available on 72 MHz by ACE R/C. We do not feel it appropriate to present 72 MHz data for the set here until all facets of the certification of 72 MHz receivers are clear to us. Again, this statement is made in anticipation of more letters on the subject from readers.

At this point, I should personally like to acknowledge the help of many individuals with whom we discussed various aspects of the system and related RC technology. These folks are listed at random as they come to mind:

Roy Dutton for an original eight-bit shift register decoder which used transistorized set and clock pulse circuitry. Sid Kaufman (SLK Circuits) who suggested ▬ encoder based on the use of a shift register. Dick Napoliton who suggested ▬ IC encoder upon which ours was patterned. John Maloney and Butch Lanterman of World Engines for suggestions for the IC servo. Sid Gates of Royal Electronics who provided a Classic receiver used for early tests. Dick Rehling of D & R who p ovided a number of servo-mechanisms for evaluation. Bob Elliot and Jim Fosgate who provided some insight to the application of FET's. Cliff Weirich of Kraft who discussed their receiver test and trouble-shooting procedures at length and made positive suggestions regarding batteries. Bob Novak of Larson Electronics who sent us a receiver—unfortunately too late for incorporation of ideas into our own receiver. To the folks at Orbit Electronics for receiver RF ideas. To local modeler Bob Young, ■ ham operator, who constructed two sets on 50-54 MHz. Last and most importantly to Paul Runge of ACE R/C Inc. who provided many of the components used in building the ten pilot units. We are indeed grateful to these people for their interest and ideas.

This completes the four-part series on the AAM Commander two-channel digital system. We hope you enjoyed reading it and truly hope that those who choose to build the set have success with it. Further, we hope that interest in the material presented here will prompt some of the tinkerers to sit up and generate some ideas for improvements, additions, or just simply new ways of doing things.

Errata: The screened pc base showing the location of the 1/8 watt, 120K resistor and motor leads for the servo in the May issue was inadvertently flipped over during photo operations. The corrected view of the bottom of the board is shown here.



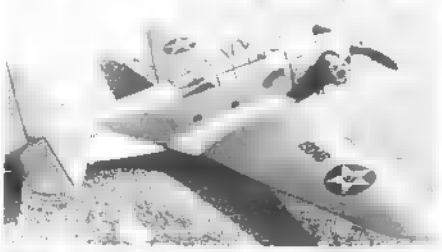
PLACEMENT OF LEADS ON ▬ OF ▬

Douglas Devastator

(continued from page 87)

The tail surfaces need to be made next from hard 3/16" balsa; a Veco elevator horn is used and epoxied to the elevator. Hinges can be cloth as shown on plans or commercial types sold for radio control use. Epoxy the elevator and stabilizer assembly to the rear of the fuselage. When dry, the wing should be epoxied to the fuselage. Bend and install the elevator pushrod next, making sure the system works freely since at low speed there is very little centrifugal force holding the airplane out at the end of the lines. A stiff or sticky control system will cause erratic flight. Bend tailhook to shape, then install to platform using "J" bolts. I highly recommend using nothing less than 3/32" music wire for the hook. Also form the tail-wheel strut using 1/16" music wire and attach to platform (I use soft wire to sew the strut to the plywood after having drilled small holes). A spring or rubber band should be installed now to pull the hook down—not much tension is required as you don't want the force of the hook to lift up the rear end of the airplane. Now install this assembly in the rear of the fuselage using plenty of epoxy glue. The fin and the rudder can be installed next, plus the top and bottom fuselage blocks. Rough shape the blocks first, then hollow out the inside before final installation. A slot will have to be made in the bottom block for the tailhook.

We now get back to the front end to make the cowling. First make sure you have drilled holes for the engine mounting bolts and installed blind nuts. Either 1/2" sheet balsa stacked together or a balsa block can be used for the cowling. Obviously the inside will need to be hollowed out to make room for the engine—a hatch in the right-hand side was made for access.



Power is a rotor with homemade exhaust throttle system. Has scored 540 points in a meet with 105 mph and 27 mph speeds.

Pre-WW II Navy colors were yellow wings, gray fuselage, and various color tail surfaces. Being so colored, the Devastator is a welcome change from all dark blue Carrier models.

The canopy comes next—here again it can be carved out of a block of balsa and installed as is. Since I dislike solid canopies I took it a step further and molded my own. This task is really not as difficult as it may seem and is worth the effort—it certainly improves the appearance of the model. What you need is a piece of either acetate or butyrate plastic sheet around .040" thick and 4 x 10" in size. Cut out from 1/8" plywood two pieces about 6 x 12" which will be used to hold the plastic while forming. Cut the bottom outline of the canopy out of the center of the two pieces of plywood, make the cutouts slightly larger (about 1/16") than the outline of the canopy. Now clamp the plastic between the two pieces of plywood and hold over a stove hot plate or in an oven until the plastic sags about 3/4" in the middle of the cutout. Now quickly pull it over the canopy form. You may have to try this several times before you get a good-looking canopy. Some plastic you can reheat again if you goofed. If little bubbles form in the plastic during the heating process it got too hot. A commercial canopy could also be used after some modification—check your hobby shop.

To get a good finish requires a lot of patience and work. Use plastic balsa to fill all the nicks and cracks. Sand the airplane with progressively finer sandpaper until a smooth bare wood finish is obtained. If you intend to use this airplane with high nitro fuels, plan to use Hobbypoxy paint. If not, a regular dope

finish can be applied. For additional strength, you may want to cover the model with either heavy silkspan or silk. My finish consisted of several coats of clear dope over the bare balsa which were sanded lightly. I then applied two coats of Hobbypoxy filler thinned down, then wet sanded with 320 paper. Next came a coat of clear Hobbypoxy also lightly wet sanded. Hobbypoxy color paint was then applied with an air brush—light gray for fuselage and wing bottom, top of the wing, yellow with a red band and black wingwalks, and a red band around the nose. Insignia decals and other markings were added before a final coat of clear Hobbypoxy was applied all over. It's also a good idea to fuel-proof the inside of the engine compartment—slop in Hobbypoxy clear especially in the corners. Now add the wheels, install the engine and you should be ready to go. Per the AMA rules for Class 1 Carrier, the control lines need to be .015" dia. and 60 ft. long when measured from the center of the handle to the center of the model. Until you get familiar with the model, avoid full-power takeoffs. With a hot 40 she really jumps off the ground.

The Second Coming

(continued from page 32)

Moffett Field, the "birds" were stripped down to a comely 13,800 lb. each, and repainted white with just the right touch of two shades of blue trim. After various shakedown flights of the aircraft, the sensor package and camera systems, the full crew of 23 had jelled into a solid unit. With the first official data acquisition flight taking place on August 31, they were off and running.

As Bob Ericson's jet blast faded over Hangar 211, in a nearby trailer Ivor Webster prepared to suit up for a short hop to test out a cranky oil pressure system in the "08." Joining the ranks of unusual characters who get dressed by putting their "hat" on first, "Chunky" was already helmeted and pre-breathing oxygen for the required 45 minutes prior to takeoff.

In the operations trailer next door, pilot Jim Barnes spoke of the crew's sense of dedication to the project. Jerking his thumb towards Webster's direction, Barnes ripped off an emphatic: "It's not just him. Or me. We *all* feel that way. The gent over there that's puttin' the suit on 'im, the mech out there with the greasy clothes on, every man in this unit does. Every one. Because they all work so hard. And there's nobody else. You can't say 'help.' There *is* no help. This is it!"

It's a small unit with a bare-bones government budget. Everyone knows everyone else. Each is dependent on the other. Each is interested and participates in the outcome. Often the pilots and the mechanics will study the day's photographs along with the data crew, since in reality they all participate in the operations and planning.

As Knutson says of the Lockheed pilots, "...and if they weren't motivated for the project—not just flying this airplane, the kind of work we hope to do for the country, mind you—we couldn't survive, because we're asking them to do a lot more than just fly an airplane."

What's it like to fly the N708NA or

Part of landing gear system, these are dropped before takeoff run starts. Front tires are non-steerable, only the tiny dual rears are steerable. The U-2 likes to ground loop all too easily. Photo by Miller.

the N709NA?

"They're slightly different. Each individual U-2 *is* an individual. Since they were hand-built, there are slight differences."

"Do you talk to 'em?"

"Oh no. We just sit there quietly and do our job."

"As a pilot's airplane, how is it?"

"Very exciting really. After that, when you're doing your work—if all systems are behaving—it's very pleasant and quite easy."

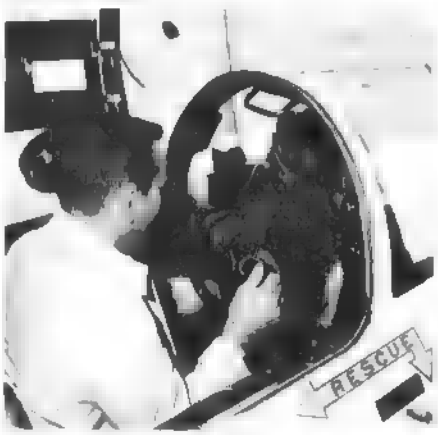
"Can you relax?"

"No. Not really. The airplane is quite a straightforward airplane. Quite simple. You've seen the inside of the cockpit. It's not modern. It's not 'state of the art,' if you will. But it's quite a simple, straightforward device. As long as you abide by the basic rules, it's quite an easy airplane to fly. . . ."

Born in the brain of Lockheed's legendary Kelly Johnson during the early Fifties, a prototype Utility-2 airplane is reported to have been begun in January 1955. Successfully flight-tested in August 1955, the aircraft entered into limited production to specific requirements. Said to have been built to have a life span of no longer than eighteen months, obviously later models of the aircraft were structurally strengthened to increase their durability factor. The additional weight forced an engine upgrading (originally P&W J-57) and resulted in better aircraft performance.

They basically have a glider configuration, for executing a "tight" 180° at 65,000 feet "there are sixteen miles

Necessary ground support equipment includes shade canopy. Pilot's don't like to sit in cockpit on the ground — air conditioning works from the engine.



Pre-flight check pilot Jim Barnes readies the ship for flight pilot Bob Ericson who is suiting up in the personnel van. Note outside rear-view mirror. Photo by Miller.

The Second Coming

(continued from page 91)

scribed by the turn." The U-2, then, is not exactly what you would call "aerobatic." Also, the differences between mach buffeting and stall-out tend to keep one alert. At altitude, going as fast as it'll go, is just about as slow as it'll go. Thus, having so narrow a flight margin, "it can bite you if you get outside its flight envelope. You've gotta mind the store!"

"Wet" wings and bicycle gear can make landing a hassle. The aircraft was designed so that towards the end of its landing roll, the fuel-heavy wing falls down. Prior to landing, NASA flight crew trucks stand by to run alongside and, as soon as the aircraft slows down enough, the crew re-insert droppable "pogos" underneath the wings to prevent its flopping over. But it's a matter of pilot and crew pride not to allow the wings to touch the ground. It's a matter of crew pride to "get there" before that happens. It's a matter of pilot pride to have the aircraft sashay past the crew trucks before the built-in metal wing skids scrape along the runway.

In the final moments before landing, the pilot will fly close to stall speed to determine his lateral CG. Then, using a cross transfer pump, he will transfer the right amount of fuel from one wing to the other. If he's got the airplane in perfect balance, he can "go into his landing roll and come to a dead stop. It's just there. Like a teeter-totter. Perfectly balanced. Fuel weighs six lb. a gallon, and he's got it right-down-to-the-gallon!" Now you *know* no self-respecting maintenance crew is going to allow *that* kind of arrogance.

Chaperoned Free Flight

(continued from page 22)

which is bound to benefit normal FF activity as well, since many of the components will be interchangeable between pure and RC FF.

Undoubtedly RC FF has all the appeal needed to become very popular. It should draw fliers from all ranks, including present RC fliers who recognize fun and a challenge when they see it. FF'ers who try it will be rewarded with the knowledge that their sport has a new lease on life.

Rules, Frequencies and Conversion

Rules to govern future competition should be kept simple and they should emphasize duration as the deciding variable. In other words, no bonus points awarded for spot landing, stunts, etc.

The problem of already crowded frequencies in RC is undeniable. It is intended that RC FF will use the 27.255 MHz spot frequency. This channel is not normally useable for RC due to interference, hand-held transmitters, certain FCC limitations, etc. However, a new concept which provides as many as 32 commands on one frequency may provide a solution and thus completely avoid interfering with present RC channels. It is also a license-free channel. The radio system requirement

Author with model. Lettering on MonoKote was done by Tom Peadon using bulletin enamel.

that later rules will specify will describe the physical size, weight, frequency and channel operation, and permit only two operating functions. Any manufacturer can produce the airborne unit for the activity, meeting only these requirements. How each manufacturer achieves the requirements will be up to him. Cost of the airborne unit will be low but the transmitter will probably be club-operated.

Several FF kits could be converted to two-channel RC with extensive modifications required only on the fuselage. The Starduster 900 and 600, the Galaxy 585, the Witch Doctor 800, and the ABC Scrambler are the most likely choices. A safe way to go about converting all of these designs would be to first reduce the dihedral angles by 50 percent and lower pylon height by 75 percent. Rudder area of the Stardusters should be doubled. The Witch Doctor and ABC Scrambler should have about 50 percent more rudder area. The rudder of the Galaxy 585 should be moved aft of the stab and doubled in area. In all cases, the fuselage would have to be widened to accommodate the receiver and batteries. A one- or two-inch nose extension will be required to retain CG location with the added tail weight of the pushrods and control horns. The Fortune Hunter control system should work fine on all of the above designs, and the rudder flap area should be retained at about 2 to 3 sq. in. The Starduster 900 might even put a few 12-foot RC sailplanes in the shade when it comes to sheer glide.

Those interested in building RC FF airplanes should feel free to write me in care of AAM if assistance is needed.

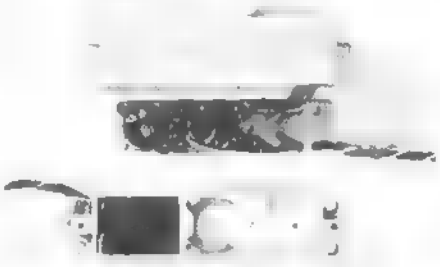
(continued from page 18)

ment is used that also indicates battery charging. A convenient carrying handle, located at the top of the case, is also ■ unique feature of the World Engines systems.

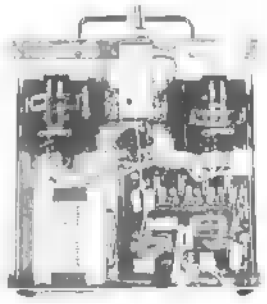
Electronically, the transmitter employs a considerable amount of the technology developed for their recent systems. The encoder uses a free running multi to set the repetition rate at a nominal 60 frames per second. This is followed by five one-shot multis (not four) with the first of these remaining fixed. World Engines theory is that the first control pulse should be "thrown away" to improve linearity of the first channel. Their latest change is to incorporate zener-regulation for the encoder power supply to avoid any possible drift when the battery pack is fully charged.

The RF section features a fixed-tuning oscillator and a single output transistor feeding ■ base-loaded antenna. On the set we tested, the final base loading was physically located at the antenna mount and was shielded, presumably as part of the design to satisfy 72 MHz certification requirements.

The receiver is relatively straightforward. It does not, ■■ had been announced in some earlier advertising, feature an FET front end. World Engines has found, as have I in my own receiver work, that the use of an FET at the time they did their design did not prove significantly advantageous. The family of FETs available until just the past few months, unless they were MOS FETs, does not perform well at our low



Two servos shown to illustrate the internal design of the S-6. Motor drives crown gear. Feedback pot mounted directly on the PC board. Servo is directly mounted on flat plywood surface in your plane.



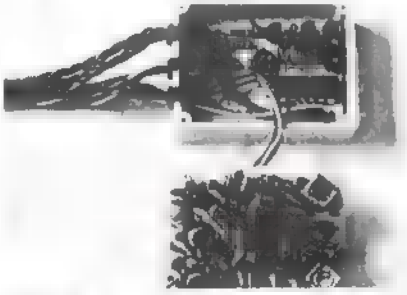
The boxed base-loaded antenna presumably is for shielding to meet FCC specs. PC board is mounted by the on-off switch. Jack for buddy box at bottom.

receiver voltages. While they do reduce intermodulation distortion, they reduce front end gain significantly. This reduction has to be regained by increasing gain in the IF strip with some risk of receiver instability. It should be pointed out that, in the past two to three months, some solid state manufacturers have come forth with FETs which are more useful for our purposes.

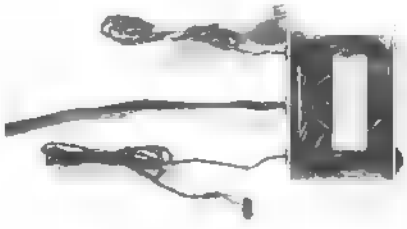
The only unique item I noted about the receiver was a large (4.7 mf) capacitor in each of the IF transformer circuits. Designer Butch Lanterman indicated that they had determined, empirically, that this aided in avoiding glitches when flying at very low altitudes, as verified by flying to maximum visual range at 10 to 20 ft. above terrain during a continuing extensive test program.

The decoder and receiver are housed in an injection molded plastic case which splits in the middle and is secured with tape. Electronically, the decoder consists of discrete components which form the clock pulses and synchronization pulses from the received pulse train. These in turn control a five-bit IC shift register for decoding. The five-bit shift register simply consists of five interconnected flip-flops with Q for each brought to one of the 14 pins on the dual in-line IC. A detailed "blow by blow" description of the manner in which a J-K flip-flop decodes was presented in the June 1972 issue of AAM as part of the AAM Commander series. The shift register is made up of five interconnected J-K flip-flops.

Servo and power connections are made via individual miniature four-pin connectors, although only three wires per servo are needed. These are not



Receiver and decoder housed in a rugged plastic box. Note space on decoder for additional functions. 72 MHz receiver is noticeably different from 27 MHz units.



World Engines has long been a user of transformer-type chargers—they are safer than the dropping-resistor-only types. Transformer prevents 110V AC electrical shock.

crimped connections—all joints are soldered and sleeved and repairs may be made at home if ever needed. A 4.8 V 500 mah General Electric nickel cadmium pack supplied the airborne unit.

The servo utilizes either the S-5 or LB-6 servo-mechanism pictured. The S-5 mechanism is quite conventional. However, the LB-6 features a very low profile for mounting in cramped confines and is quite conveniently mountable to a flat plywood floor using simple wood screws. The low profile is achieved by mounting the 11 ohm Furuichi motor horizontally and driving the gear train via a crown gear arrangement. The LB-6 also features both rack and rotary outputs. While it sacrifices a slight amount of thrust, the LB-6 was found to be more than adequate to handle the 60-powered Five Star via Nyrod linkages.

The system was installed in the Pilot "Five Star" which is imported by World Engines. Assembly of this foam and vacuum formed ABS plastic model is an easy evening's activity. The wing panels were joined using Hobbypoxy Formula II epoxy. If you feel wealthy and are in a hurry, five-minute epoxy could be used! After the wing is joined, a plastic "glove" is fitted over the center of the wing and bonded in place using the plastic solvent provided—presumably Methyl Ethyl Ketone (MEK). This must be done very carefully because it provides the primary carry-over strength for the wing center, so be sure the solvent actually flows under the glove at the edges and press the parts together until they set. Shear strength is also enhanced by using contact cement as a bond in the areas not bonded by the solvent. Leave at least 1/4" around the edges of the "glove" with contact cement on it to permit a proper bond by the MEK.

Assembly of the horizontal stabilizer must also be carefully done to ensure a good, strong joint. There is a little slop between stab and fuselage joint so be sure to press the plastic joints together until thoroughly set.

The only remaining assembly tasks are simple. The control surfaces are already covered so installation of the brass hinges is done by cutting slots in the surfaces and in the trailing edges of the wing and stabilizer. This is best done by mating the surfaces and marking both simultaneously with a pencil before cutting. Press all the hinges into the slots in the control surfaces, then work carefully from one end of the control surface back and forth until the hinges engage the slots cut in the trailing edge. The trailing edges have a solid balsa piece inset so there is a grip for the hinges. A note of caution: be very certain that you have the hinges where they belong when they are set in place and that you haven't forgotten the crossbar for the elevators. The prongs on those brass hinges really hang in there and removal, much less their coming loose in flight, would be extremely difficult.

The landing gear goes in place just as

shown in the instructions. A good-looking, serviceable nose gear with steering arm is provided.

The equipment was installed in the Five-Star by Duane Lundahl and we are most grateful. Herewith is Duane's commentary on the installation:

"The installation of the radio in the Five Star was the simplest I have ever done. This results from the very large radio compartment and design of the Five Star combined with the extreme simplicity of mounting the Low Boy servos. Since the servos can be mounted on a flat surface, the usual necessity for carefully spacing and drilling beam mounts is unnecessary. The Five Star has 'floor to ceiling' plywood sides in the radio compartment which makes the installation of a 'floor' to mount the servo very simple. The new 'flexible' Nyrods were used (the yellow/pink ones) and they also added to the ease of installation."

Evaluation

The World Engines set was found to be excellent and, in my opinion, significantly better than the preceding Blue Max set. In fact, I chose to use their servo amplifier in the AAM Commander now appearing in AAM. The measure of performance was largely the flight test of the set in the Five Star. Performance was generally excellent. During the test program in the Five Star, one momentary glitch was encountered in ■ environment in which glitches have become all too common.

Transmitter Dimensions (1)	7 W x 7 H x 2-1/8 Deep
Receiver Dimensions	1-7/8 L x 1-7/16 W x 1-1/8 H
Servo Dimensions (S-5)	2-3/16 L x 1-1/16 H x 7/8 W
Servo Dimensions (LB-6)	3-11/16 L x 1-1/8 H x 3/4W ■ includes mount lugs, height includes output arms)
Battery Pack Dimensions	2 L x 1 1/8 x 1 1/8
Average Servo Thrust, LB-6	2.85 Lb/6 1/4 in radius, ■ = .7 in lb
Average Servo Thrust, S-5	4 lb @ 1/4 in radius, torque = 1.0 in lb
System Linearity	See plotted resolution curves
Airborne Weight	Approximately 12 oz for the test system

(1) ■ dimension, ■.

We have tabulated measured performance data and, in addition, measured end-to-end resolution and linearity in a manner similar to that for the past two sets reviewed. After the data was plotted for the S-5 and LB-6, it occurred to us that this might not mean much to the reader without something not so recent with which to compare. Therefore the performance of an S-4a servo, which has been flown for two years, was also checked. The new IC servo deviates little from strict linearity. Further, the scatter or "jitter" of the new servos is much less than for the S-4a. Static measure of S-4a performance reveals it to be relatively good. Dynamic performance, however, is another story. The new servos move quite smoothly in both directions while the S-4a (and many discrete component amplifiers) produce a rather jittery motion when moved continuously be-

cause of the error deadband.

As seen in the tabulation, servo thrust is quite good. World Engines has expressed some concern in the past about the thrust of the LB-6 being less than for the S-5. This need not be a concern because although there is 0.3 in.-lb. difference in the torque, these servos proved quite readily equal to the control force demands of the 60-powered Five Star.

The Five Star is designed to be near equivalent to the Kwik-Fli. Performance is smooth and relatively docile. Landings are quite easy primarily because of the large wing area. In summary, we found that the airplane would be an excellent advanced and competition trainer. The model is rugged, easy to build, and turns out to be quite good-looking.

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(continued from page 112)

JUNE 4–MESQUITE, TEX. (A) Dallas RC Club Pylon RC Warm-Up. Site: Samuels East Park. D. Brown CD, 930 Vinecrest Ln., Richardson, Tex. 75080. Sponsor: Dallas RC Club.

JUNE 4–BRISTOL, CONN. (AA) Hornets Model CL Classic. Site: Edgewood School. J. Scott, Jr. CD, 265 Witches Rock Rd., Bristol, Conn. 06010. Sponsor: Hornets Model Airplane Club.

JUNE 4–MUNCIE, IND. (A) 1st Annual Munsee Skychiefs Fun-Fly. Site: Prairie Creek Reservoir. J. McDonald CD, Box 384, Daleville, Ind. 47334. Sponsor: Munsee Skychiefs RC Club of Muncie.

JUNE 4–MILWAUKEE, WISC. (AA) Circle Masters CL Meet. Site: Dretzka Park. R. Brotz CD, 1800 S. Cardinal Ln., New Berlin, Wisc. 53151. Sponsor: The Circle Masters.

JUNE 4–WAUSAU, WISC. 5th Annual Fun-Fly. Site: Club Field. K. Sparr CD, P.O. Box 441, Wausau, Wisc. 54401. Sponsor: Wausau RC Sportsmen, Inc.

JUNE 4–DAYTON, OHIO (AA) Spring CL Fly-In. Site: Dayton. J. Haupt CD, 3908 Necco Ave., Dayton, Ohio 45406. Sponsor: Dayton Buzzin' Buzzards.

JUNE 4–DURHAM, CONN. Flying Aces Club Spring Meet. Site: Durham. R. Thompson CD, Hat Shop Hill, Bridgewater, Conn. 06752. Sponsor: Flying Aces Club.

JUNE 4–CHANDLER, ARIZ. (A) Beginners RC Pattern Meet. Site: Memorial Airfield. R. Pisar CD, P.O. Box 1451, Scottsdale, Ariz. 85252. Sponsor: Miniature Aircraft Pilots Assn.

JUNE 4–LANCASTER, OHIO. F.O.R.K.S. Quarter Midget RC Meet. Site: FORKS Field. J. Slater CD, 809 Forest Rose Ave., Lancaster, Ohio 43130. Sponsor: Fairfield Ohio RC Society, Inc.

JUNE 4–WARREN, MICH. (A) RCCD Sport Pylon Contest. Site: RCCD Field. H. Mottin CD, 2124 Common, Warren, Mich. 48092. Sponsor: Radio Control Club of Detroit.

JUNE 9-10-11–ASHEVILLE, N.C. (AA) 18th Annual RCNC Invitational RC Meet. Site: Asheville. D. Pearce CD, 1005 Ainsworth Ct., Greensboro, N.C. 27410.

JUNE 10-11–KANSAS CITY, MO. (AA) KC/RC Annual RC Meet. Site: Lake Jacomo Park. K. Borgman CD, 9700 E. 82nd, Rayton, Mo. 64138. Sponsor: Kansas City Radio Control Assn.

JUNE 10-11–SAN JOSE, CALIF. (AA) Wavemasters Annual RC Contest. Site: Wavemasters Field. K. Wilson CD, 728 Bolivar Dr., San Jose, Calif. 95123. Sponsor: San Jose Wavemasters RC, Inc.

JUNE 10-11–PENSACOLA, FLA. (AA) Southeastern RC Model Airplane Championships. Site: N.C.T.C.-Corry Field. R. Chidgey CD, 3713 Pompano Dr., Pensacola, Fla. 32504. Sponsor: Pensacola Aeromodelers Club.

JUNE 10-11–PENSACOLA, FLA. (AAA) Fiesta of Five Flags S.E. FF Model Airplane Championships (Cat. II). Site: Pensacola, T. McLaughlan CD, 4140 Fern Ct., Pensacola, Fla. 32503.

JUNE 10-11–CHESAPEAKE, VA. (AA) TRC 6th Annual AA RC Meet. Site: Fentress Air Field. M. Woolard CD, 301 Haledon Rd., Chesapeake, Va. 23320. Sponsor: Tidewater RC Club, Inc.

JUNE 10-11–ELKGROVE VILLAGE, ILL. (A) Chicagoland RC Modelers RC Meet. Site: Route 53 & 72. D. Wehrheim CD, 1841 W. Fletcher St., Chicago, Ill. 60657. Sponsor: Chicagoland RC Modelers, Inc.

JUNE 10-11–MARIETTA, GA. (AA) Annual CCRC Meet. Site: Club Field. J. Harper CD, 900 Piedmont Cir., Marietta, Ga. 30060. Sponsor: Cobb County RC Modelers.

JUNE 10-11–HOUSTON, TEX. (AA) Houston RC Club Annual AA Meet. Site: Houston RC Club Field. B. Striegler CD, 5831 McKnight, Houston, Tex. 77035. Sponsor: Houston Radio Control Club.

JUNE 11–SHOREVIEW, MINN. (B) Minnesota State RC Stunt Championships. Site: St. Paul RC Club Field. D. Granlund CD, 7213 Oliver Ave., N., Brooklyn Center, Minn. 55430. Sponsor: St. Paul RC Club.

JUNE 11–INA, ILL. (A) Aerobats M.A.C. RC Fun-Fly. Site: Rend Lake College. C. Pucket CD, 213 Grant St., Mt. Vernon, Ill. 62864. Sponsor: Aerobats Model Airplane Club.

JUNE 11–W. SUFFIELD, CONN. (A) Nor'East RC Air Races '72. Site: NCRCC Field. H. Wainauski CD, 38 Alder Rd., Simsbury, Conn. 06070. Sponsor: Northern Connecticut RC Club.

JUNE 11–CLEVELAND, OHIO (AAA) 6th Annual CL Aeromodel Sport Race. Site: Cleveland Hopkins CL Model Flying Field. R. Sargent CD, 1694 Wright Ave., Rocky River, Ohio 44116. Sponsor: Skylarks.

JUNE 11–DAVENPORT, IOWA (A) 15th Annual CL Model Airplane Contest. Site: Davenport Airport. T. Magers CD, 1403 E. 33rd St., Davenport, Iowa. Sponsor: Davenport M.A.C.

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JUNE 11—SACRAMENTO, CALIF. (AA) Northern Calif. FF Council FF Meet (Cat. I). Site: Waegell Field. W. Vanderbeek CD, 630 Ashlan Ave., Palo Alto, Calif. 94306. Sponsor: 900 Club.

JUNE 11—N. LITTLE ROCK, ARK. (A) MARCS 3rd Annual RC Contest. Site: MARCS Field. F. Osborne CD, 18 Mohave, N. Little Rock, Ark. 72116. Sponsor: Mid Arkansas RC Society.

JUNE 11—WESTMINSTER, MD. (A) Westminster CL Meet. Site: Carroll County VO Tech Center. R. Pease CD, 65 E. Main St., Westminster, Md. 21157. Sponsor: Westminster Aero Modelers.

JUNE 11—LINCOLN PARK, N.J. (A) East Coast CL Scale Championships. Site: Lincoln Park. E. Dickson CD, 36 Vreeland Ave., Clifton, N.J. 07011.

JUNE 11—CHICAGO, ILL. (AA) Aero Angels Annual CL Meet. Site: Forest Preserve. D. Hardt CD, 7371 N. Lincoln, Chicago, Ill. 60646. Sponsor: Aero Angels.

JUNE 11—VALKARIA, FLA. (A) Florida Miniature Pylon RC Races. Site: Valkaria. W. Schoonard CD, 2080 Sharon Dr., Winter Park, Fla. 32789. Sponsor: R.C.A.C.F.

JUNE 11—LAKEHURST, N.J. R/V RC 5th Annual Novice Meet. Site: Lakehurst. A. Schroeder CD, 18 Spencer Rd., Glen Ridge, N.J. 07028. Sponsor: Rockaway Valley RC Club.

JUNE 11—HILLSBORO, ORE. (A) Nor'Wester Monthly FF Meet (Cat. II). Site: Hillsboro. B. Gaiser CD, 4235 SW Agate Ln., Portland, Ore. 97201. Sponsor: Nor'Westers.

JUNE 11—VAN NUYS, CALIF. (AA) Valley Circle Burners Annual CL Meet. Site: Sepulveda Basin. B. Cohen CD, 7323 Amestoy Ave., Van Nuys, Calif. 91406.

JUNE 11—BRIGHTON, WISC. (B) Pelican Annual N.I.M.A.C. FF Meet (Cat. II). Site: Brighton R. Elman CD, 17707 Burnham Ave., Lansing, Ill. 60438.

JUNE 11—CHAGRIN FALLS, OHIO (AA) 8th Annual E.M.A.A. Old Timer FF Meet. Site: Savage Road. L. Reichel CD, 3301 Cindy Ln., Erie, Penna. 16506.

JUNE 11—LAKE ELSINORE, CALIF. (AA) N.A.R. Flightmasters 3rd Annual R.O.W. Scale Meet. Site: Lake Elsinore. C. Hatrak CD, 3825 W. 144th St., Hawthorne, Calif. 90250. Sponsor: N.A.R. Flightmasters.

JUNE 16-18—SPOKANE, WASH. (AAA) Spokane FF, CL ■ RC Internats. Site: Spokane Int'l Airport. Lt. Col. R. Hepker CD, Spokane Int'l Airport, Spokane, Wash. 99219.

JUNE 17-18—DENVER, COLO. (AA) 14th Annual Mile-Hi RC Contest. Site: Lowry A.F.B. H. Geller CD, 6920 E. Exposition, Denver, Colo. 80222. Sponsor: Mile-Hi RC Club.

JUNE 17-18—DES MOINES, IOWA (A) Des Moines Modelaires Annual RC Contest. Site: Modelaires Field. K. McClure CD, 5703 Terrace Dr., Des Moines, Iowa 50312. Sponsor: Des Moines Modelaires, Inc.

JUNE 17-18—SPRING VALLEY, ILL. (A) Illinois Valley RC Meet. Site: Spring Valley Airport. A. Annis CD, 2103 Madison St., Streator, Ill. 61364. Sponsor: Illinois Valley RC Club.

JUNE 17-18—DAYTON, OHIO (AA) Wright Brothers Memorial Annual RC Meet. Site: Wright Patterson A.F.B. D. Lowe CD, 3491 Clar-Von Dr., Dayton, Ohio. Sponsor: Western Ohio RK Society.

JUNE 17-18- FT. WORTH, TEX. National RC Fun Fly Championships. Site: Thunderbird Field. ■. Lutker CD, 5333 Wooten Dr., Ft. Worth, Tex. 76133. Sponsor: Fort Worth Thunderbirds.

JUNE 17-18—ENDICOTT, N.Y. (A) 7th Annual Northeast RC Pylon Championships. Site: to be announced. B. Noll CD, 96 Pine Knoll Rd., Endicott, N.Y. 13760. Sponsor: The Aeroguidance Society, Inc.

JUNE 17-18—DALLAS, TEX. (AA) CCC 4th Sun and Fun Annual FF Meet. Site: Dallas. F. Perkins CD, P.O. Box 873, Richardson, Tex. 75080.

JUNE 18—MUSCATINE, IOWA (AA) 3rd Annual CL Meet. Site: Muscatine Plaza. F. Brewer CD, 706 Walnut, Muscatine, Iowa 52761.

JUNE 18—URBANA, ILL. (AA) C-U Aeronauts 10th Annual CL Meet. Site: Illini

Airport. J. Fasimpaur CD, 310 E. Benham St., Tolono, Ill. 61880. Sponsor: Champaign-Urbana Aeronuts.

JUNE 18—SALEM, N.H. (AA) Salem CL Model Airplane Fair. Site: Salem High School. R. Sherman CD, 408 River Rd., Tewksbury, Mass. 01876.

JUNE 18—AURORA, COLO. (A) MMM Monthly FF Meet (Cat. II). Site: E. Colfax Air Park D. McGhee CD, 1260 Elm, Denver, Colo. 80220. Sponsor: Magnificent Mountain Men.

JUNE 18—AURORA, COLO. Old Timers Fun-Fly. Site: E. Colfax Airpark. D. Millard CD, 510 S. 43rd St., Boulder, Colo. 80303. Sponsor: Model Museum Flying Club.

JUNE 18—OHIO CITY, OHIO (A) Club RC Contest. Site: Club Field. D. Kraner CD, RR No. 1, Ohio City, Ohio 45874. Sponsor: SHOO Flyers M.A.C., Inc.

JUNE 18—MEMPHIS, TENN (AA) Memphis Prop Busters CL Meet. Site: McKeller Park. T. Cimino CD, 981 June, Memphis, Tenn. 38177. Sponsor: Memphis Prop Busters.

JUNE 18—DETROIT, MICH. (AA) Cloudbusters Inc. 10th Annual CL Meet. Site: Rouge Park. C. Wentzel CD, 30612 Dover, Warren, Mich. 48093.

JUNE 18—FELTON, DELA. (A) Dover Mosquitoes ECSS Soaring Contest. Site: Felton. G. Durney CD, 107 Silver Lake Dr., Dover, Dela. 19901. Sponsor: Dover Mosquitoes RC Club.

JUNE 24-25—DAHLGREN, VA. (AA) Annual RC Tournament. Site: Naval Weapons Lab. J. Spalding CD, 5803 Ellerbie St., Lanham, Md. 22801. Sponsor: DC/RC Club.

JUNE 24-25—KENT, WASH. (AAA) Boeing Management Assoc. Model Aeronautics Scholarhsip FF (Cat. II), CL, RC ■ Ind. (Cat. I) Meet. Site: Boeing Space Center. B. Nelson CD, 22919 105th Ave., SE, Kent, Wash. 98031. Sponsor: Kent Strat-O-Bats M.A.C.

JUNE 24-25—HUNTSVILLE, ALA. (AA) MACH FF Contest. Site: Old Hunstville Airport. M. Penny CD, 2105 Rosewood Cir., N.W., Huntsville, Ala. 35810. Sponsor: Model Airplane Club of Huntsville.

JUNE 24-25—PENSACOLA, FLA. Northwest Florida RC Modelers Fun-Fly. Site: N.A.S. Ellyson Field. W. Fritts CD, 206 Hermey Ave., Pensacola, Fla. 32507. Sponsor: Northwest Florida RC Modelers.

JUNE 24-25—CHATTANOOGA, TENN. (A) TVRC Fun-Fly. Site: TVRC Field. J. Wyatt CD, 502 Young Ave., Chattanooga, Tenn. 37405. Sponsor: TVRC.

JUNE 24-25—LONGVIEW, TEX. (AAA) District VIII FF (Cat. II), CL ■ RC Championships. Site: Marathon Model Airport. T. Southern CD, 2207 Paul, Longview, Tex. 75601. Sponsor: Northeast Texas Model Airplane Club.

JUNE 25—COUNCIL BLUFFS, IOWA (AAA) 9th Annual Midwestern Model CL Contest. Site: Iowa School for the Deaf. D. Hutcheson CD, 317 Spencer Ave., Council Bluffs, Iowa 51501. Sponsor: Council Bluffs Balsa Busters.

JUNE 25—ROCKFORD, ILL. (AAA) Rockford Aeromodelers Triple A CL Meet. Site: Riverdahl Field. J. Tappainer, Sr. CD, 508 Pearl St., Rockford, Ill. 61108. Sponsor: Rockford Aeromodelers.

JUNE 25—EDWARDSVILLE, ILL. (A) First Annual RC Fun Fly Contest. Site: Edwardsville. A. Gonzalez CD, 80 Shirlwin Dr., Granite City, Ill. 62040. Sponsor: East Side RC Club.

JUNE 25—FRESNO, CALIF. (A) Fresno Monthly FF Meet (Cat. I). Site: Near Kerman. F. Ginder, Jr. CD, 5740 E. Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

JUNE 25—HADLEY, MASS. (AA) Hampshire County Radio Controllers RC Meet. Site: Hadley R. Barkowski CD, 32 Lyman St., Easthampton, Mass. 01027. Sponsor: Hampshire County Radio Controllers.

JUNE 25—APPLETON, WISC. (A) Valley Aero Annual RC Meet. Site: Club Field. J. Schmieding CD, 2118 N. Division St., Appleton, Wisc. 54911. Sponsor: Valley Aero Modelers.

JUNE 25—QUEENS, N.Y. (AA) Forest Park 4th Annual CL Contest. Site: Flushing Meadow Park. R. Moore CD, 128 N. Elm St., N. Massapequa, N.Y. 11758.

JUNE 25—YOUNGSTOWN, OHIO (A) 3rd Annual CL Combat Smasher. Site:

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Austintown Township Park, J. Peters CD, 315 Bradford Dr., Canfield, Ohio 44406. Sponsor: Ohio Flying Aces.

JUNE 25—MILLERSPORT, N.Y. (AA) United RC Pylon Racing Circuit Meet. Site: Millersport. H. deBolt CD, 49 Colden Ct., Buffalo, N.Y. 14225.

JUNE 25—COOK COUNTY, ILL. (AA) Skylarks 5th Annual A ■ B w/Standoff Scale Meet. Site: Ned Brown Forrest Reserve. R. Swindell CD, 842 C Colonial Dr., Wheeling, Ill. 60090. Sponsor: Skylarks RC of Illinois.

JUNE 25—HEMPSTEAD, N.Y. (AA) Meroke 8th Annual RC Meet. Site: Mitchel Field. R. Geyer CD, 913 Washington St., Baldwin, N.Y. 11510. Sponsor: Meroke RC Club.

JUNE 25—HASTINGS, MICH. (AA) 9th Annual Hastings FF Meet (Cat. I). Site: City Airport. W. Cain CD, 4326 Kennilworth, SE, Grand Rapids, Mich, 49506.

JUNE 25—FT. WAYNE, IND. Invitational Fun-Fly. Site: Smith Airport. W. Weber CD, 2022 Kensington Blvd., Ft. Wayne, Ind. 46805. Sponsor: Fort Wayne Flying Circuits, Inc.

JUNE 25—BENTON HARBOR, MICH. (A) 1st Annual RC Glider Contest. Site: Benton Harbor. A. Lukaszewski CD, 3310 S. Lakeshore Dr., St. Joseph, Mich. 49085. Sponsor: Whirlwinds of SW Michigan, Inc.

JUNE 25—STRUTHERS, OHIO Delta Dart Contest. Site: Struthers Field House. R. Plant CD, 550 Freeman St., N.W., Warren, Ohio 44483.

JULY 1-2—ABILENE, TEX (AA) Prop-Twisters 4th Annual CL Championships. Site: Seabee Park. E. Thomas CD, 5349 Harwood, Abilene, Tex. 79605. Sponsor: Key City Prop Twisters.

JULY 1-2—MOBILE, ALA. 8th Annual G.C.R.C. Contest. Site: Plum Forty, Mobile. J. Sabine CD, 10 Maury Dr., Mobile, Ala. 36606. Sponsor: Gulf Coast RC, Inc.

JULY 1-2—CHARLESTON, W. VA. (AA) Mountaineers "Firecracker" RC Contest. Site: Diamond W. Va. RC Field. S. Sturm CD, Box 5234, Vienna, W. Va. 26101.

JULY 1-2—LAKEHURST, N.J. Old Timer RC ■ FF Fun-Fly. Site: Lakehurst N.A.S. E. Woodman CD, 389 Floral Ln., Saddlebrook, N.J. 07662. Sponsor: North Jersey RC Club.

JULY 1-2—ROANOKE, ILL. (AA) Peoria RC Modelers RC Meet. Site: Roanoke. R. Speerly CD, ■ Wilshire Dr., Washington, Ill. 61571.

JULY 1-2—OSSEO, MINN. (AA) Minneapolis Piston Poppers Annual CL Meet. Site: No. Henn Jr. College. J. Sinton CD, 4941 Wisconsin, New Hope, Minn. 55428. Sponsor: Minneapolis Pistun Poppers.

JULY 1-2—SPRINGFIELD, MO. (AA) Springfield RC Club 2nd Annual AMA RC Contest. Site: Springfield RC Airport. G. Langston CD, 616 Tracy, Springfield, Mo. 65804. Sponsor: Springfield RC Club.

JULY 1-2—BEAUMONT, TEX. (AA) Beaumont Open RC Meet. Site: Beaumont. D. Still CD, 306 Orleans, Beaumont, Tex. 77701. Sponsor: Beaumont Radio Control Club.

JULY 1-2—SAULT STE. MARIE, ONTARIO, CANADA. Annual Open RC Contest. Site: Sinclair Model Airport. G. Allen CD, RR No. 2, Fourth Line, Sault Ste. Marie, Ontario, Canada.

JULY 1-2—ALBANY, GA. (AAA) Georgia State FF, CL, RC, Ind. (Cat. II) Championships. Site: Albany Naval Air Station. B. Stevenson CD, 209 Sourwood Dr., Marietta, Ga. 30060. Sponsor: Cobb County Sky Rebels.

JULY 2—W. SUFFIELD, CONN. (A) NCRCC/ECSS Soaring RC Contest. Site: NCRCC Field. G. Sawn CD, 6 Audrey Ln., W. Suffield, Conn. 06082. Sponsor: Northern Connecticut RC Club.

JULY 2—SOUTHFIELD, MICH. (A) Cloudbusters FF Thompson Trophy Races. Site: Southfield. R. Kuenz CD, 14645 Stahelin, Detroit, Mich. 48223.

JULY 2—VAN NUYS, CALIF. (A) SCAMPS .020 & Commercial Rubber Meet. Site: Sepulveda Basin. G. Wallock CD, 220 LeRoy Ave., Arcadia, Calif. 91006. Sponsor: SCAMPS.

JULY 2—COUNCIL BLUFFS, IOWA 1st Falcon Event. Site: Cobra Field. H. Hough CD, 924 Avenue I, Council Bluffs, Iowa 51501. Sponsor: Cobras Radio Control Club.

JULY 4—MENTOR, OHIO (AA) MARCS Firecracker Classic RC Meet. Site: Tyler Blvd. R. Penko CD, 21151 Westport Ave., Euclid, Ohio 44094. Sponsor: Mentor Area RC Society.

JULY 8-9—VALLEY FORGE, PENNA. (A) Valley Forge RC Scale Classic. Site: Valley Forge State Park. N. Evans CD, 970 Steven Ln., Wayne, Penna. 19087. Sponsor: Valley Forge Signal Seekers.

JULY 8-9—WALLOPS ISLAND, VA. (AA) MARKS 7th Annual RC Meet. Site: Wallops Island. H. Jones CD, 59 Aigburth Ave., Towson, Md. 21204.

JULY 8-9—DAVENPORT, IOWA (AA) 4th Annual RC Contest. Site: Scott County Park. R. Zimmerman CD, 1212 22nd St., Rock Island, Ill. 61207. Sponsor: Davenport Radio Control Society.

JULY 8-9—TULLAHOMA, TENN. (AA) Annual RC Contest. Site: Airfoiler Field. L. Webster CD, 1000 Sycamore, Manchester, Tenn. 37355. Sponsor: Coffee Airfoilers.

JULY 8-9—OAK CORNER, N.Y. New York State Fly-for-Fun Championships. Site: Oaks Corners. H. Ford CD, 11 Stephens St., Clifton Springs, N.Y. 14432. Sponsor: Sky-Rivers Flying Club, Inc.

JULY 8-9—MADERA, CALIF. (A) 2nd Annual Independence Day RC Races. Site: Madera Airport. M. Chisolm CD, 1589 W. Celeste Ave., Fresno, Calif. 93705. Sponsor: Fresno Radio Modelers, Inc.

JULY 9—DES MOINES, IOWA (AA) Model Manglers of Iowa CL Meet. Site: Ewing Park. R. Baldes CD, 6719 Colby, Des Moines, Iowa 50311. Sponsor: Model Manglers of Iowa.

JULY 9—E. GRANBY, CONN. (AA) Nor-East RC Air Races-'72. Site: E. Granby. B. Williams CD, 347 Southwick Rd., Westfield, Mass. 01085. Sponsor: Northern Connecticut RC Club.

JULY 9—LOCKPORT, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Lockport. R. Daniłowitz CD, 3245 Creek Rd., Youngstown, N.Y. 14174.

JULY 9—CLEVELAND, OHIO (AAA) Cleveland Aeromodel "Firecracker" Special CL Meet. Site: Cleveland Hopkins CL Model Flying Field. G. Baker CD, 13925 Liberty Ave., Cleveland, Ohio 44135.

JULY 9—BLAINE, MINN. (AA) Minneapolis Model Aero Club Annual Summer FF (Cat. II) Contest. Site: Hentges Sod Farm. W. Anderson CD, 1000 E. River St., Monticello, Minn. 55362.

JULY 9—ST. LOUIS, MO. (AAA) Hot Heads Pre-Nats CL Championships. Site: Buder Park Model Flying Field. G. Frost CD, 22 Glynn Dr., Florissant, Mo. 63031. Sponsor: Hot Heads Model Airplane Club.

JULY 9—WARMINSTER, PENNA. (A) Sky Pirates FF (Cat. II) Meet. Site: Johnsville NADC T. Kerr CD, 7824 Lexington Ave., Philadelphia, Penna. 19152. Sponsor: Philadelphia Sky Pirates M.A.C.

JULY 15—HILLSBORO, ORE. (A) Nor'Westers Old Timer Meet. Site: Hillsboro. J. Anderson CD, 1495 N.W. 136th Ave., Portland, Ore. 97229. Sponsor: Nor'Westers Model Airplane Club.

JULY 15-16—CHELAN, WASH. (AA) 1st R.A.F. RC Air Fair. Site: County Airport. R. Carson CD, 3029 W. Hoffman, Spokane, Wash. 99205.

JULY 15-16—MENOMONEE FALLS, WISC. (AA) 2nd Annual Pre-Nats RC Warm-Up. Site: Aero Park Airport. F. Morrissey CD, 14100 W. Park Ave., New Berlin, Wisc. 53151. Sponsor: Milwaukee Flying Electrons, Inc.

JULY 15-16—POCATELLO, IDAHO (AA) Pocatello Invitational FF & CL Model Airplane Contest. Site: Pocatello. E. Culver CD, 231 Fairbanks, Pocatello, Idaho 83201. Sponsor: Pocatello Glue Angels.

JULY 15-16—BAY ST. LOUIS, MISS. (AA) Gulf States FF Meet. Site: Bay Side Park. J. Pedreira CD, 4658 Redwood St., New Orleans, La. 70127. Sponsor: Dyna-Soarers Model Aircraft Club.

JULY 16—HOUSTON, TEX. (A) Manned Spacecraft Center RC Soaring Contest. Site: NASA/MSC. B. Striegler CD, 5831 McKnight, Houston, Tex. 77035. Sponsor: Manned Spacecraft Center RC Club.

JULY 16—ST. LOUISVILLE, OHIO (AA) Licking County RC Meet. Site: A. Neithers Farm. A. Dupler CD, Box 186, Millersport, Ohio 43042. Sponsor: Licking County RC Club.

JULY 16—AURORA, COLO. (A) MMM Monthly FF Meet (Cat. II). Site: E. Colfax Air Park. G. Baughman CD, Rt. 1, Perry Park Ranch, Larkspur, Colo. 80118. Sponsor: Magnificent Mountain Men.

JULY 16—ODESSA, TEX. (A) Odessa A ■ B Pattern RC Contest. Site: Odessa RC Field. J. Davis CD, 3633 Adams, Odessa, Tex. 79760. Sponsor: Odessa Prop Busters RC Club.

JULY 16—COLUMBUS, OHIO (AA) 7th Annual Central Ohio CL Championships. Site: Lockbourne A.F.B. J. Everett CD, 4661 Larkhall Ln., Columbus, Ohio 43229. Sponsor: Capital City Controliners.

JULY 16—SUNNYVALE, CALIF. Annual Kosby Flying Tournament. Site: Pioneer Field. J. Sunday CD, 6667 Rainbow Dr., San Jose, Calif. 94040. Sponsor: Pioneer RC Club.

JULY 16—LAKEHURST, N.J. (A) RC Old Timers Meet. Site: Lakehurst N.A.S. E. Weiss CD, 276 Michael Ave., Elberon Park, N.J. 07740. Sponsor: Monmouth Model Airplane Club.

JULY 16—DENVER, COLO. Old Timers Fun-Fly. Site: E. Colfax Airpark. W. Baldridge CD, 1464 S. Lafayette, Denver, Colo. 80210. Sponsor: Model Museum Flying Club.

JULY 16—TUCSON, ARIZ. (A) Summer Slow Fest for CL. Site: Rodeo Park. C. Dierdorf CD, 2242 Monterey Vista, Tucson, Ariz. 85713. Sponsor: Cholla Choppers M.A.C.

JULY 22-23—ELMIRA, N.Y. Harris Hill Hobo Meet. Site: Harris Hill. R. Miller CD, 22 Kings Cir., Corning, N.Y. 14830. Sponsor: The Flying Sparks, Inc.

JULY 23—MILPITAS, CALIF. WAFFC 4th Annual FF (Cat. I) Meet. Site: Milpitas Field. R. Douglas CD, 5303 Calderwood Ln., San Jose, Calif. 95118. Sponsor: Oakland Cloud Dusters.

JULY 23—OHIO CITY, OHIO. Club Fun-Fly. Site: Club Field. D. Kraner CD, RR No. 1, Ohio City, Ohio 45874. Sponsor: SHOO Flyers M.A.C., Inc.

JULY 23—LAKE ELSINORE, CALIF. (A) Thunderbugs Class A FF (Cat. II) Meet. Site: Lake Elsinore. J. Bonang CD, 11620 Freeman, Hawthorne, Calif. 90250. Sponsor: Thunderbugs M.A.C.

JULY 23—TACOMA, WASH. MRRCS "Funny Farm" Seaplane Fun-Fly. Site: Wargho Lake. B. Gale CD, 811-9th Ave., S.W., Puyallup, Wash. 98371. Sponsor: Mt. Rainier RC Society.

JULY 23—COUNCIL BLUFFS, IOWA. 2nd Falcon Event. Site: Cobra Field. D. Hutcheson CD, 317 Spencer, Council Bluffs, Iowa 51501. Sponsor: Cobras RC Club.

JULY 23-24-25—CHICAGO, ILL. (AA) 3rd Annual RC Soaring Nationals. Site: Miller Meadow. D. Pruss CD, Rt. 2, Box 490, Plainfield, Ill. 60544. Sponsor: S.O.A.R.

JULY 24-30 -CHICAGO, ILL. (A) Nats-Week CL Sport Combat Meet. Site: Glenview Naval Air Station. W. Messerly CD, 1122 Eight Mile Rd., Cincinnati, Ohio 45230. Sponsor: Queen City U-Control Club.

JULY 24-30—GLENVIEW NAVAL AIR STATION, ILL. (AAAA) National Model Airplane Championships. Traditional Events. For Nats entry blank send pre-addressed and stamped envelope to: Academy of Model Aeronautics, 806 Fifteenth Street, N.W., Washington, D.C. 20005.

JULY 29-30—GREENWOOD, S.C. (A) Piedmont RC Fun-Fly. Site: Greenwood. L. Nash CD, 722 Greenville St., Pendleton, S.C. 29670. Sponsor: Greenwood Radio Aircraft Modelers.

JULY 30—ST. CLAIRSVILLE, OHIO. Hill Hoppers RC Fun-Fly. Site: St. Clairsville. A. Grimes CD, 115 Glenwood Rd., Wheeling, W. Va. 26003. Sponsor: Hill Hoppers Model Club.

JULY 30—FRESNO, CALIF. (A) Fresno Monthly FF Meet (Cat. I). Site: Near Kerman. F. Ginder, Jr. CD, 5740 E. Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

JULY 30—FT. WORTH, TEX. (A) Pylon Formula I RC Meet. Site: Thunderbird Field. G. Ware CD, 609 S. Lake St., Ft. Worth, Tex. Sponsor: Fort Worth Thunderbirds.

RC GEAR NEW

1—Blue Max, 4 channel, II stick with four s4a servos, built, $330.00
Sale, $194.44

2—MRC713, 3 channel, with two #2 servos, $180.00.
Sale, $144.00

3—MRC710, II channel, [illegible] 72MC, with four [illegible] servos, retail $350.00
Net, Sale, $244.44
ON-27MC, $330.00.
Net, Sale $234.44

4—Here [illegible] a list of the most popular wanted RC items at the country's lowest prices!

5—Special discounts to clubs and dealers. Inquiries welcomed
Wanted: old ignition engines - any condition. Top prices paid

6—IN STOCK FOR IMMEDIATE DELIVERY [illegible] WE TRY TO ADVERTISE ONLY THOSE PRODUCTS WHICH WE HAVE IN STOCK.

7—New Proline, II channel single, closed stick.
Sale, $350.00

8—New Digit Pylon, 4 channel, single stick, regular $265.00.
Sale, $205.00

9—Orbit Hawk 3 channel for gliders [illegible] 2 NEW servos, pak and channel. $219.95
Net $140.00

10—Blue Max, 4 channel, Semi kit, $235.00
Sale, $160.00

11—New 1971, [illegible] 2 channel, complete with Airborne nicad pak, retail $139.95
Sale $100.00

USED RADIO GEAR—PROPORTIONAL

101—Used RC are like used cars. They will perform better than the new fangled, high priced and over priced gadget prone[illegible] new sets that are on the market today.

102—Banner II channel, Digimite on 72 240 MC, with 9 servos working, 2 stick, very clean
$200.00

103—Log 5, 2 stick, 4 [illegible], working, complete.
$140.00

104—Banner Digimite, 4 channel, 4 [illegible], working, clean.
$140.00

105—3 channel Sankyo Digital, 3 servos, dual charger, needs servicing
Sale, $50.00

106—Digit might, complete TX, [illegible] servo [illegible] motor servo like [illegible]
$50.00

107—Healthkit Built-up, like new, 5 channel with four RPG servos, working
$150.00

108—Orbit single stick, II channel, works like [illegible] Longines watch - all 8 [illegible] work [illegible] time, complete with extra airborne [illegible], II chargers, enough for 2 planes
$200.00

109—PCS, II channel on 53.1 MC, like new, working, 5 servos
$150.00

110—Sampey - 404, single stick II servos.
$110.00
Complete with II servos
$100.00

111—Orbit, II channel 2 stick, II servos. Working
$150.00

112—Complete 8 channel, working Banner 'B', like new with 6 servos [illegible] 53 MC
$140.00

USED RADIO GEAR—MISC.

201—10 channel, C'Aire reed set, 5 RF servos, nicad pak, needs servicing
$50.00

202—Used Digital servos, Banner, C'Aire, EK, each $15.00

203—C'Aire, 10 channel TX, rec., II transmites, pak, [illegible] working was $80.00
Now $70.00

204—10 channel, C'Aire TX, rec., 3 transmites, 2 C'Aire servos, pak, and medio charger
[illegible]

205—C'Aire, [illegible] channel, [illegible] & TX, 2 servos II pak
$45.00

206—C'Aire [illegible] TX, rec and ghost actuator, clean
Sale [illegible]

207—C'Aire GG set complete and working with Rand Dual Pak
Sale $60.00

208—Citizenship GG, set, [illegible] & rec, plus Rand Dual pak with charging card, like new

209—C'Ship CNT, 10 channel transmitter
$12.00

210—Tona Monitor Gyro (rec & speaker)
Sale $7.00

211—I [illegible], 6 channel Citizenship, 6 channel Read TX (SL-6) II rec (RL-6) & 3 TCB servos, superb II, multi-channel, $210.00
Sale, $65.00

212—Ford GT electric powered car with II channel, C'Aire reed SH, 3 ounce [illegible] servos, all mounted and working with charger
$99.99

213—F&M, 10 channel Matador, TX & Rec., II transmites, nicad pak, all wired, like new, but needs a little work
$70.00

BUILT-UP RC PLANES

301—NEW Topflite P-51-B, Enya [illegible] EK 6-Ch, 5 servos flaps, ailerons, all new all installed, wheels, just gas up and fly
Sale, $550.00

302—Ready to fly, major model, WW-I, Sauiner with new McCoy 29RC and new Digital 4 channel, tested and flown
$300.00

303—Built-up, deluxe [illegible] Skylane 62, flaps, ailerons, [illegible] 5 channel, scale shock [illegible] gear, been flown & tested. [illegible]
$450.00

304—Jack [illegible] Midget Mustang, new [illegible]

305—Commanche, built-up with [illegible]
$150.00

306—All new, beautiful Fleet Bipe for 60RC, [illegible] yellow, [illegible] with 5 cyl dummy motor
$150.00

307—Fleet Bipe for ST-71 [illegible] OS-80, white fuse, orange wing, [illegible] II doped
$150.00

308—) Stafford [illegible] Ercoupe, deluxe, very clean, professional workmanship
$200.00

309—Miss Bikini, low wing sport plane, high gloss finish [illegible] and blue [illegible], silked [illegible] very [illegible]
$75.00

310—Deluxe Sopwith [illegible] scale, WW-I Bipe, very new, detailed, $500.00 labor
Sale $250.00

311—Very high gloss finish olive [illegible] and light blue, IF P-51B fibre glass finish fillets [illegible] bottom cowl flaps, was $325.00 Now $250.00

312—Very deluxe TF, P-51, flaps, rods, wheels, spinner, silked, was $250.00
Sale $195.00

313—Built-up [illegible] ready to fly, GG Shoestring, with Johnson Combat Special 35RC, rods installed
Sale $75.00

314—Nelson Quick Silver, low wing [illegible] [illegible] II good small stunt ship
$75.00

315—Shoestring scale, pylon racer, for .RB40 [illegible] mount, very deluxe, silked, yellow & black trim $135.00

316—Andrews Trainermaster, silked, neat and built right $140.00

317—Major Model Sauiner, ailerons, WW-I Stable $70.00

318—Sterling P-51, flaps, racing red color, deluxe, clean, professional workmanship, built right and strong, II scale finish $175.00

319—Grouppez Viking 60" low wing, new, silked and new $40.00

320—TF SE 5A WW-I Bipe all new, brown and [illegible], average finish, silked
$100.00

321—Sterling, built-up SE-5 Bipe with OS-30RC installed, WW I colors, wheels, rods
[illegible]

322—Original Class II, pylon racer, very nice, 600 sq [illegible] for 40 engine
$100.00

323—DeBolt Cobra, built-up, silked, for 60RC Sale
$125.00

324—Sterling, very, very nice, camouflaged spitfire for 60RC Deluxe Built-up silked & very clean
$200.00

325—Williams Brothers La Jolita for 40RC, very clean
$125.00

326—Absolutely immaculate Falcon 56, silked, scale-like paint finish $100.00.

327—Consolidated Spirit high wing [illegible], 54" wing for 19 25 engine, very clean silked $65.00

328—Very deluxe TF Taun/Aileron, all rods, wheels $95.00

329—GG Shoestring, just [illegible], yellow and orange, very clean $125.00

330—Major Model Sauiner WW-I Monoplane, very clean, silked rods, wheels, sharp Hobby Poxi finish.
$95.00

331—Built-up TF Taun trainer, ailerons Sale
$45.00

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International Sport Aviation: the FAI, NAA & AMA

In its broadest definition "sport aviation" includes all forms of flying for recreation as well as competitive purposes.

Many years ago, in fact just two years following the Wright Brothers' 'first flights' at Kitty Hawk in a powered aircraft, the Federation Aeronautique Internationale was formed in France to promote non-commercial aviation by standardizing regulations and scientific methods of measurement so as to foster continued competition in the field of the aeronautical sciences and sport.

History recorded this beginning of international sporting aviation when the Olympic Congress, in Brussels on June 10, 1905, passed a resolution in the following terms: "This Congress, recognizing the special importance of aeronautics, expresses the desire that in each country there be created an association for regulating flying and that thereafter be formed a universal aeronautical federation to regulate the various aviation meetings and advance the science and sport of aeronautics."

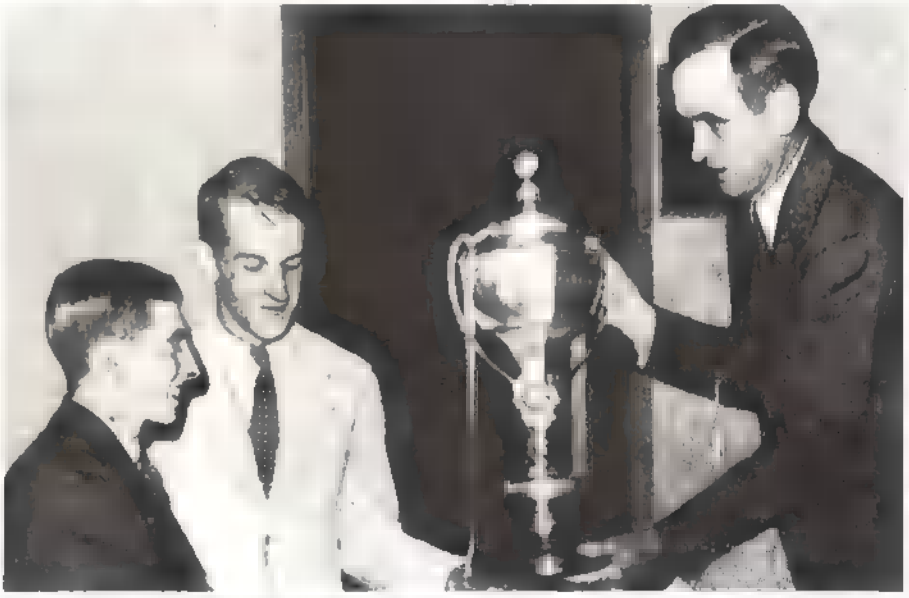
The Aero Club of France was invited by the Olympic Congress to call a meeting which could give effect to the resolution, and an assembly of the countries interested was held in Paris on October 12, 1905. The Federation was born only two days later, when the first statutes and by-laws were signed.

The objectives of the FAI are set forth in detail in the statues, but from the point of view of the public the principal activities of the FAI can be summarized as follows:

1. The creation and continuous modernization of a sporting code which permits fair and scientific comparison of the performances attained by pilots of different nations in the air and in space.

2. The homologation of world and class records in all forms of aeronautics and astronautics. This means that whoever claims to have established [redacted] broken a record in the air or in space must have his performance checked and controlled by his national FAI organization which in turn sends the complete information to FAI headquarters where, if everything is found correct, the record is declared "official".

3. The organization of regular World Championships in all aeronautical specialities: Airplanes, Helicopters, Balloons, Gliders,



The oldest [redacted] most famous of the World Championships is for the Lord Wakefield Cup shown in this 1936 newspaper reprint. Albert Judge of England, left, won the cup—presentation by Gordon Light, 1935 U.S. winner, and H.W. Alden who represented the AMA and NAA.

'72 NATS

"Go" for Glenview July 24 - 30

In a dramatic reversal of an earlier decision the U.S. Navy has decided that one more Nats can be hosted, as a 25th anniversary closeout to the program which began in 1948. Final Navy approval came on April 21; the President's Memo in this issue was written earlier—at a time when Navy continuance was in question and alternate solutions were being explored.

The Navy's turnabout was for many reasons, but principal among them was that planning had progressed almost too far to call off. Hundreds of contestants and officials had already arranged vacations, trophies were already being ordered, entry forms were in final stages of preparation, etc. In addition AMA offered to cover direct Navy expenses from the contest (typically from $10,000 to $15,000) and to provide all personnel except those for crowd control. The Navy took all this into account and agreed that one more Nats could be accommodated.

THANKS, NAVY!

ENTRY INFORMATION

The advance entry postmark deadline of June 19 still applies. Those who do not enter by this date can only enter at the Nats and only on Monday, July 24.

ENTRY FORMS are available from AMA HQ, 806 15th St., N.W., Washington, D.C. 20005. When requesting an entry form, be sure to enclose a pre-addressed stamped (8 cent) envelope.

ENTRY FEES, event schedule, etc., are similar to last year, exceptions detailed in the Executive Council report of the June AAM, page 100. Another change is that FF timing will be time-one, fly-one.

Parachutes, Aeromodeling.

Today the FAI includes 45 countries in its membership with an additional 13 countries represented through specialized national clubs for limited interests (parachuting, gliding, and aeromodeling), where there is no overall interest organization established.

Internally, the FAI's work is carried on through 12 international committees, including the Aeronautic Sporting Committee (which takes care of all aeronautical record keeping); the General Aviation Committee; Gliding Committee; the Astronautics Committee, the Helicopter Committee; Parachuting Committee; the Aeromodeling Committee, the Aviation and Space Education Committee; and the Aerobatics Committee.

The FAI has been in existence for over 60 years. From 20 to 30 countries normally participate in Aeromodeling Committee meetings. Most are in Europe but the U.S., Canada, Mexico, Australia, and Japan are among notable participants from outside Europe. Russia and its satellite nations are also active participants. In many countries only FAI rules are used to govern aeromodeling activities. The FAI therefore, provides the only universal aeromodeling language and regulations shared around the world.

BACKGROUND

U.S. participation in FAI programs is a matter of long history, dating back to the early thirties. Prior to the establishment of the AMA, in 1936, such participation was through the National Aeronautic Association. When AMA came into existence, as the aeromodeling division of NAA, participation in FAI activities continued and expanded with NAA assistance. AMA participation in FAI activities is still responsible to the NAA—only one organization per country, known in the FAI as the National Aero Club (NAC), is authorized to represent each nation. NAA is the NAC for the United States but NAA delegates its authority for FAI aeromodeling activities to the AMA. Such activities now involve three distinct areas: world championships, world records, official meetings.

United States teams to world championships participate through specific AMA programs concerning selection and transportation. The U.S. also occasionally hosts FAI World Championships: Free Flight (rubber power only) in 1939 at Teterboro, N.J., and in 1948 at Akron, Ohio; Free Flight (rubber and gas power) in 1954, Long Island, N.Y.; Radio Control (aerobatics) in 1971, at Doylestown, Pa. AMA also co-hosted the 1958 FF World Championships in Germany and assisted with other world meets.

Individual AMA members regularly attempt to establish new FAI aeromodeling world records, and there are over thirty such records currently in being. AMA has established procedures for U.S. record attempts and the certification of same. All paperwork concerning world record claims must go through AMA then to the NAA and the FAI.

The FAI annually hosts a major meeting for the purpose of reviewing and updating international regulations concerning world championships and world records. At this meeting, delegates from all FAI member-nations may participate. AMA has provided regular representation at these meetings since the late forties, with transportation assistance from the NAA. Such representation has been through the FAI's Committee for International Aero Modeling (CIAM); each country is authorized one delegate to the committee.

In addition there are CIAM subcommittees for each major aeromodeling activity (FF, CL, RC, Scale, Rockets), and while national representation is not automatic in these groups, AMA members frequently serve various terms of appointment. AMA members have also frequently been elected to serve various officer positions in the CIAM.

AMA by-laws provide for participation in FAI activities under the supervision of the AMA president, or his appointed delegate. In addition, the AMA Executive Council has made specific policy decisions concerning the extent and nature of AMA participation in FAI matters, particularly concerning areas of U.S. team selection, financing of FAI activities, and priorities of participation.

Policies, procedures, and guidelines concerning AMA participation in FAI activities have been developed intermittently over many years, mostly piecemeal as specific needs or problems demanded attention. Current FAI activities within AMA are, therefore, governed as a result of a compilation of decisions over the years. Except as defined in this document there was not previously any single course of information or reference.

POLICIES/PROCEDURES

1. Finances

a. Basic Funding: Ten percent of AMA membership dues income is annually budgeted for FAI activity. It was established in 1962 that this amount would be used exclusively for overseas participation. Through the years this has evolved to apply to all FAI activity, both at home and abroad. Typically this budget covers transportation expenses in Europe for U.S. teams to world championships and U.S. delegations to meetings.

It also includes payment of world championships entry fees for U.S. teams (which includes food and lodging at the contest). Meeting delegates similarly have basic lodging and food expenses covered as well as transportation expenses from home and return.

The FAI budget has also been used in recent years to help promote FAI team selection programs and to cover some basic expenses involved, such as printing and mailing of program information to participants, telephone expenses of program administration, attendance of the program administrator at the team selection finals.

Priorities for use of FAI budgeted funds were established in 1964, when finances were meager, in the following order: Team members, team manager, representatives to meetings. In practice, however, this has never had to be applied. In fact the 10% budget has seldom been used completely in anyone year, and any surplus has always been returned to the general AMA treasury.

b. Team Funds: Special escrow funds are maintained by AMA to provide transportation

(Turn to page 108)

Bob Carpenter, Chuck Schuette and Bob Lauderdale made up the 1965 U.S. CL Speed team which competed in Russia. Lauderdale came in 5th, the winner being Krizsma, Hungary.

A Tribute to the U.S. Navy

PRESIDENT'S MEMO

The time has come for the officers and membership of the Academy of Model Aeronautics to offer a grateful, thoughtful, and proud salute to the U.S. Navy for its many years of cooperation! Through their co-sponsorship and cooperation in hosting our National Model Airplane Championships, the Navy, for 24 years, has endorsed the principles under which the Academy of Model Aeronautics is serving the American community. We can be justly proud of this!

At press time it was not certain whether the Navy could continue its co-sponsorship of our National Championships for 1972. For the past several years the Navy has each year overcome seemingly impossible problems to continue its cooperation, but word has come from the Navy's Chief of Information in Washington that budgetary "belt-tightening" dictates discontinuance of the Nats and other programs of this type. This brings on a mixture of feelings which includes a great sorrow for the breaking of active association between what we feel to be two of the world's greatest organizations, a feeling of profound thanks for the past, and reflections of where we've been and where we are going.

I ponder the thought of the kind of people we've gotten to meet in our association with the Navy. In all of the planning that has gone into 24 consecutive National Model Airplane Championships our AMA "Brass" has become well acquainted with our counterparts in the Navy "Brass", or officer types. No group could have ever offered us more cooperation. We enjoyed many fine personal friendships which developed from our associating with the Navy's officers.

And we cannot praise enough the spirit and willingness of the Navy's main "work group", the Chiefs and enlisted men. They were greatly responsible for helping make all 24 of our Nationals successes, in activities completely different from anything that they were used to. That was Navy Pride at work!

I have been one of those privileged to watch this NAVY PRIDE at work for all of those 24 years. The Navy invited us, AMA, as a progressive section of the civilian community into their "homes", the various Naval air facilities. They offered us the handclasp of friendship, and the men and muscle to get the job done. I have watched the way they tackled problems; none [redacted] strange to them as hosting a model airplane championship! The pride and determination with which they tackled these problems has always been a handsome thing to watch. To [redacted] the Navy break their routine and overnight convert a Naval Air Station to accommodate a hundred or so AMA Officials, 15 [redacted] 16 hundred participants in the model flying events, and the thousands of spectators that the championship activity attracted is really something. It has always been done so smoothly that very few realized what a fantastic accomplishment it really was. And to add even more wonderment, the day AFTER the Nats was over, it was all Navy "business as usual"!

The Navy's skill at improvising should be called to the attention of every tax paying citizen! His life might someday depend on it, and we've seen it [redacted] action. The initial planning of a Nationals could never begin to cover the unexpected problems that always kept jumping out of the bushes at us. This meant that IMPROVISING truly became "the name of the game". It is well known that model plane builders learn to be improvisers, and our contest officials certainly find ample chance to express this talent in running the competition part of the Nats. But few people realize what experts the NAVY FOLKS are at IMPROVISING, SCROUNGING, and MAKING-DO! Their claim is that "the [redacted]possible just takes a little longer to get done." Our AMA high-echelon Nats planning group, the Nationals Executive Committee, has had lots of opportunity to see the Navy in this creative improvising role. And please keep in mind that since the Navy is the primary defender of our homeland's shores it is comforting to know that the Navy's talent for improvising makes each of our homes a little safer! This is a NICE FEELING!

President John Clemens (L) and Executive Director John Worth (R) met in February with Capt. [redacted] Dyekman, C.O. of Glenview N.A.S. The Navy has agreed to be Nats host one more time—which will round out 25 fabulous years for the Nats/Navy combo.

In reflection, I have an odd feeling that for 24 years we have made a rather unique contribution to the Navy by providing them with a set of entirely new problems, once a year, upon which to practice their improvising skills. This fact was even voiced by one of the hosting commanding officers during a casual conversation.

One of the finest things that came from the Navy's hosting of the Nats was the fact that, for most of the 24 years, Navy facilities were available which made it possible to move the National Championships Meet around the country aboard various Naval Air Stations. A four-point rotational program was set up, moving the meet first to the East Coast, then the North, the West Coast and the South. This gave most youngsters a chance to compete at national level in their own part of the country at least once while they were in the Junior (or youngest) age class of competition, and again at least once while in our intermediate age class, and again as an adult.

It goes without saying that the Nationals will never be the same without the Navy. But with the assistance they have given us in the past we should now have the strength and experience to carry on under some different plan. Much work must be done to establish a sound new plan. It is my sincere hope that we can work out something that will again move the Championships Meet around the country as before, or possibly establish three or four regional open meets each year of near-Nationals importance, scattered geographically across the nation, with the qualifying winners meeting to compete in a smaller winners-only championships.

NO, THE NATIONALS WILL CERTAINLY NEVER BE QUITE THE SAME WITHOUT THE NAVY! As President of the Academy of Model Aeronautics it is my privilege to act as spokesman for our entire membership in a SALUTE TO THE NAVY FOR 24 YEARS OF FRIENDSHIP. And, if it has turned out that the Navy can be host once more to the Nats this year, we can celebrate the occasion as a 25th anniversary tribute by declaring NAVY APPRECIATION WEEK for the 1972 Nats.

John E. Clemens
AMA President

Scene from the 1969 RC World Championships in Germany, above: French entrant Pierre Marrot (far right) going to the flight line, retinue following. A careful and proficient competitor, he always had a back-up model ready. Jim Richmond, right, came in 2nd flying in a huge Romanian salt mine in 1978. Two years earlier he won the World Champion title for Indoor when the contest was in Italy.

aid for U.S. world championship teams. These are known as Inboard Travel Funds, which means that they are intended to be used to offset travel costs within the U.S.–from team members' homes to the point of departure for overseas, and return.

These funds are developed and maintained from contributions and by entry fees collected from participants in team selection programs. All money from these sources go to the team funds without any deductions for expenses to cover fund maintenance by AMA. Similarly, no deductions for expenses are permitted for operation of team selection meets–all program entry fees go into the fund for the particular program. In the event that any fund is insufficient to pay complete inboard travel expenses the deficit is divided equally among the team members involved–each team member pays for his share of the difference.

c. FAI Stamps: The FAI requires that all participants in world record attempts and official FAI competitions have an FAI Sporting License. In practice, this means that the FAI section of the AMA license is certified official for such use when an FAI stamp is affixed. Stamps are purchased by AMA from the FAI, through the NAA. Sales of FAI stamps by AMA provides income which helps to offset the cost of AMA affiliation with the NAA and FAI.

AMA is also obligated to pay NAA an annual fee of ten cents per adult member. This, in effect, is the cost of AMA's franchise to regulate FAI aeromodeling activities in the U.S.A. The NAA similarly pays an annual fee to FAI for the broader franchise of regulating all FAI activities in the U.S.A., including soaring, ballooning, parachuting, and other sport aviation activities in addition to aeromodeling.

FAI stamps serve another useful purpose for AMA; they help to indicate the size and relative strengths of various category interests in FAI. Stamp sales are identified with the category involved (FF, RC, CL, Scale, Indoor) so that a measure of each interest is provided. This helps to determine the proportion of AMA effort and funds to be allocated to a particular interest.

Total stamp sales also help to indicate the proportion of AMA members involved in FAI activities; which helps to determine how much AMA effort should be devoted to FAI programs as a whole, in comparison to non-FAI activities. Currently it appears that about five percent (approx. 2000) of the AMA membership participates directly in FAI activities and this is about the percentage of AMA dues income which is spent on FAI (including the NAA fee).

2. Team Selection Programs

Through the years a series of executive decisions, by the president and/or the Executive Council, have produced the basics by which team selection programs are operated.

a. Scope: The 1966 council stated that the base of such programs should be broadened as much as possible, to encourage participation by more members. Maximum opportunity for participation by AMA members has thus been established as a primary goal. This has meant that programs have been aimed at making it as simple as practical for AMA members to get involved at least the early stages of team selection programs. Then, by requiring progressively increased performances, the programs serve to narrow down the total of those qualified to those finally selected.

This policy is intended to pick the best possible team while encouraging the broadest base of participation. In practice it works out that the best people end up on top, through a larger program than might otherwise be necessary if maximum participation was not a factor. Some compromise is involved because factors of travel, time involved, and cost to participants frequently dictate that some other than optimum conditions for team selection are imposed, yet the natural result is that any of those who finally win out are extremely well qualified to be team members.

b. Finals: A single, centrally located flyoff has evolved through the years as the preferred basis for team selection. In such a flyoff the top qualifiers gather at the same place and time to fly against each other under the same conditions of weather, terrain, officiating and opportunity. This is generally considered to be the ideal situation.

Official policy is currently to require a single centrally located flyoff unless a suitable site is not available. In the latter case, two or more regional flyoffs may be required or, if at least 60% of the participants approve, a non-central single site may be authorized. Central is defined as being within 600 miles of Kansas City.

Regional flyoffs are not approved, however, for those events which involve judging as a major factor in determining winners. Thus for RC or CL Aerobatics (pattern or stunt) and CL Team Racing a single site finals is required regardless of location.

c. Planning: The 1964 Executive Council established that FAI competition programs in all categories will be formulated by committees organized by a chairman who is appointed by the president. These committees are supposed to present proposals in writing to the president for approval prior to January 1 of the year in which the team is to be selected. The president then obtains the recommendations of the executive director and the AMA's CIAM voting representative concerning acceptance or modification of the proposals. Upon approval of the program the committee is dissolved and its members are free to participate in the program.

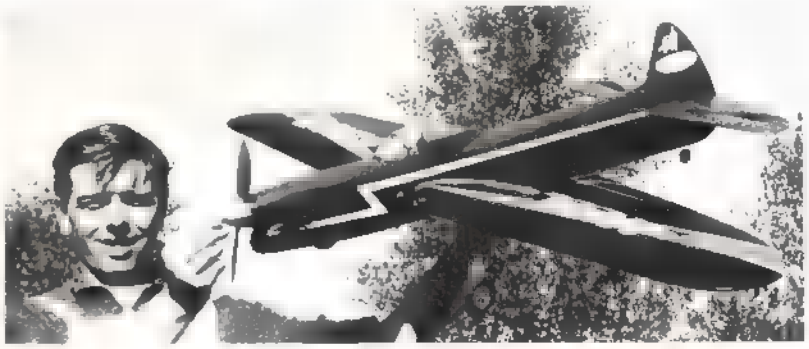
d. Polls: In 1971 a new policy was initiated as a result of controversies concerning finals site problems and decisions. Under this policy, immediately following the end of a program, the participants are to be polled concerning their desires for the next program, particularly concerning the nature and number of finals sites. The purpose is to determine whether previous policies should be retained or modified–it was recognized that changes in thinking had developed on the part of many participants with an apparently increasing number favoring a return to regional flyoffs. The poll provides a means of measuring the strength of such thinking.

In polling to decide the question of single or multiple finals sites, a 60% majority of those responding must be in favor of the single site. Failure to achieve the 60% majority automatically decides in favor of multiple sites. Whether two or three sites are to be used depends upon site availability; such decision to be approved by the AMA president after hearing recommendations from the program administrator, the executive director, and others the president may choose.

On poll details other than site selection a simple majority vote by those responding decides the issues. Also, if more than one flyoff site is available in a program, finalists may decide for themselves which site they will fly at, but they may fly at only one of the sites.

The 60% voting factor for finals location acknowledges that most programs have large groups of east and west coast participants and that a single site decision in favor of one area involves a hardship for the other. It was felt,

Ernie Shallor holds for U.S. team member Gene Schaap winding Wakefield at 1965 World Championships in Germany. Sponsored jointly by AMA and the German Aeroclub with U.S.A.F. help, this was the first WC to combine all the FF events: Wakefield, Power, Glider.



Top L: Phil Kraft, standing, was the RC World Champion in 1967, placed 2nd in 1969 and 3rd in 1971. He's assisted by Jim Edwards. Top R: Until recently Europeans have been tops in the CL Stunt World Championships, 1962 winner Gronal of Begium shown. L: 1962 U.S. CL Team Race team, Stockton and Jehlik, numbers 108 and 109, were Team Race World Champions later on. R: Much pomp and ceremony is associated with WC competitions. Bud Romak is shown receiving the 2nd place team trophy for the U.S. at the 1968 Indoor World Championships.

therefore, that a simple majority for this important decision would place too much weight in too few hands–a more substantial majority is desired to make a positive decision to go to a site which will involve much travel hardship.

e. Decision-making: Although the AMA president has by-laws authority to make all decisions regarding FAI matters, in practice several other people get involved. In 1964 the president requested and received the backing of the AMA Executive Council concerning a standard procedure for decision-making regarding approval of team selection programs, appointment of program administrators, appointment of team managers.

The procedure provides for consistency and continuity of such decision-making from one president to another. It also assures that all programs are operated according to the same criteria and that decision-making is confined to AMA officers without any personal involvement or conflict of interest.

The procedure requires that the president shall obtain the recommendations of the AMA executive director and the CIAM representative (AMA voting delegate) to the Committee for International Aero Modeling of the FAI. If the president has authorized another person to serve as his personal delegate for decisions concerning team programs, the recommendations of this person are also sought.

In addition, the Executive Council in 1966 made further policy statements concerning team programs. It said that administration of programs should be made in accordance with HQ recommended procedures and also that HQ should use program committees for guidance in defining team selection programs but that final procedures would be determined by HQ, with the concurrence of the FAI coordinator (CIAM representative) and the president.

In 1968 the Executive Council further strengthened the requirement for joint agreement of the key officials concerning team manager appointments by voting to require that the team selection program administrator shall receive first consideration for TM appointment, the appointment made with the concurrence of the president, FAI delegate (CIAM representative) and the executive director. The council also added that whenever possible the appointment shall be announced prior to selection of the team. In practice it has evolved that unanimous agreement of the officials described has been the basis for decision-making. Although not defined and required, it has also evolved that the executive director's recommendations usually involve extensive consultation with the AMA HQ staff personnel most familiar with FAI activities, both as previous competitors and officials. Thus, the total input to decision-making has typically involved about a half dozen people who have had extensive and continuing background covering all categories of interest.

f. Participation by Officials: The program administrator is not permitted to compete for team selection. Program committees (used to study and recommend future programs) may not be used to make decisions in current programs–such committees are usually made up of competitors ■ the program, and this requirement ■ to avoid having any self-interest stigma attached to committee actions. Similarly, Contest Directors in team programs cannot participate as competitors except as follows: those meets that are three levels away from the final team selection contest may be directed by Contest Directors who are also competitors. This is to encourage more activities at the qualification level in those programs which provide for quarter and semi-finals prior to the finals.

g. Schedules: In 1964 the AMA Executive Council directed that team selection programs be completed prior to January 1 of the year in which the world championships competition was held. This decision resulted from earlier panic situations in which teams barely had time to get overseas following the team finals; in many cases team members didn't meet each other until on the way overseas. Also, the rush situations disrupted headquarters' operations. Since 1964, teams have had adequate time for preparations, communications and testing prior to departure. The basic result has been better teamwork and more time to work out travel and related problems.

Similarly, a requirement for new program announcement by January 1 of the year in which team selection program is to be initiated has evolved. The intent is to provide maximum time for potential participants to study a program and decide whether to get involved, considering such factors as site locations and dates, travel and vacation planning. In practice this announcement deadline has usually been met on time or within 30 days of it.

Unfortunately, it has not always been

Tom Brett, U.S. team member at the controls, above, was the RC Aerobatic World Champion in 1962. This was the 2nd RC/WC, organized in England. With him are Don Brown and Gordon Gabbert. Left: Two itenerant Australians who both are Wakefield World Champions. Alan King, lighting fuse, won the cup in 1953 when the contest was in the U.S.; Bond Baker won in England in 1958.

possible to announce finals site details at this time as site availability is seldom known far enough in advance. In such cases knowledge of current policies concerning how the finals site is to be selected serves in lieu of more specific information. If, for example, it is known that a central site is intended to be used, and the dates are announced in advance, travel and vacation planning can proceed. Problems can still develop, however, if the site becomes unavailable and a substitute is only available on different dates.

3. FAI Meetings

All aeromodeling meetings are conducted under the jurisdiction of the FAI's Committee for International Aero Modeling (CIAM). There are four classes of regular CIAM meetings: Plenary, Technical, Bureau, and Subcommittee. AMA representatives normally participate in two and often in all. Bureau and subcommittee meetings are for members only, or by invatation only, so our participation in those meetings depends upon varying circumstances from year to year. The differences between the four classes of meetings are as follows:

a. Plenary: This is the annual meeting, usually held in the last quarter of each year, at which rules changes and other official actions of the CIAM are voted upon. This is the most important meeting since it has jurisdiction over actions taken at all other meetings. Voting is on the basis of one vote per country and only one officially recognized delegate per country (although he may be assisted by other people from his country).

Voting at plenary meetings is in accordance with a predetermined agenda. Items for the agenda may be submitted by any National Aero Club (AMA for the U.S.A.), but they must be sent in writing at least 70 days in advance of the meeting date. Agenda items are then compiled and circulated to all aero clubs at least 45 days prior to the meeting. Agenda items may also be submitted by the Bureau and by the chairmen of subcommittees, the latter subject to approval of a majority of subcommittee members.

For the U.S.A., the meeting timetable usually requires agenda items to be received by the AMA before September 1 (sometimes as early as August 1). These are then compiled and reviewed by AMA officers for submission to FAI headquarters by mid-September. Upon receipt of the official agenda from FAI, copies are circulated to key AMA-FAI officers for comment and recommendations for voting. The official U.S. position to be taken on agenda items is then determined by consultation between the U.S. CIAM representative (voting delegate) and/or the AMA president.

The AMA president appoints our voting delegate. This usually must be done by mid-year, since the name has to be submitted by the National Aeronautic Association before the annual general FAI conference takes place—usually in June. It has been AMA-NAA policy to have delegates serve long-range terms, usually five to ten years, to assure a continuity and accumulation of experience.

The job of delegate involves broad interest, spanning the categories of Free Flight (indoor and outdoor), Control Line, Radio Control, Scale, and Rockets. He must be prepared to vote on matters involving any and all aspects of each category. The delegate is aided in his voting by three inputs: communications from key AMA leaders involved in FAI activities, advice and recommendations from U.S. members on the various FAI subcommittees and by the combined know-how of the accompanying members of the U.S. delegation attending the meeting.

The U.S. delegation typically consists of the voting delegate, the AMA president, the AMA executive director, any U.S. chairman of FAI subcommittees. So, while only the voting delegate can speak officially for the U.S., he seldom acts alone. The AMA president decides the makeup of the U.S. delegation, although it is obligatory that the voting delegate and any subcommittee chairmen must attend. The size of the delegation depends mostly on transportation availability—the NAA usually provides over-ocean travel for from three to six U.S. representatives.

One of the responsibilities of the plenary meeting is to elect officers of the Bureau (CIAM president, one or more vice-presidents, the technical secretary and the general secretary).

The Bureau is the CIAM authority in between plenary meetings, and the term of office is for the year following the plenary meeting at which the election takes place.

Chairmen of FAI subcommittees are also elected by the CIAM delegates at the plenary meeting. Chairmen are not intended to be national representatives; neither are other members of the subcommittees. The latter are appointed by the chairmen, with approval of the members' national aero club. This non-national status of subcommittee members means that, while they may (and naturally do) reflect the viewpoint of their country, they are obligated to act on behalf of the FAI as a whole rather than any individual nation.

b. Technical: These meetings are held in conjunction with the annual plenary meetings, usually on the day before. Technical meetings may be attended by voting delegates, subcommittee members, and observers. Observers are not permitted to participate in discussions, however, unless authorized by the meeting chairman. The basic purpose of the technical meetings is to review, discuss, and clarify all agenda items for the subsequent plenary meeting. This activity serves to provide background and to promote understanding of agenda items before any voting action.

The technical meetings also serve to indicate various national positions on agenda items. This knowledge is useful in later discussions after the meeting to enable delegates to caucus and seek support for their views. This provides an opportunity for political maneuvering and persuasion prior to official voting. Votes are usually taken at technical meetings, but these are not binding and serve only to indicate the preferences of those attending.

Because technical meetings for all categories of interest usually take place simultaneously, it is a problem for each nation to participate in all. For the U.S. the problem is handled by dividing the delegation to attend as many technical meetings as possible.

c. Bureau: CIAM officers (president, vice-president, secretaries) constitute the Bureau. The Bureau usually meets once a year, in the spring. Also invited to attend are subcommittee chairmen and anyone else the CIAM president wishes—typically a representative from any country scheduled to host a world championships in the same year.

One of the main purposes of the Bureau meeting is to review plans for upcoming world championships and to make decisions concerning same. The Bureau also reviews results of the previous plenary meeting and decides if any Bureau proposals are to be submitted for the next plenary meeting. The Bureau also

acts as a mid-year interim CIAM policy and decision-making authority, subject to ratification of actions at the subsequent plenary meeting.

d. Subcommittee: Each subcommittee is intended to provide expert know-how concerning the category of interest. Subcommittees meet during and at world championships. They meet to discuss problems of the category, proposals or recommendations referred to them by subcommittee members or by plenary meeting actions.

Such meetings produce recommendations to the Bureau and plenary meetings. Subcommittees do not have any direct power concerning rules or other FAI matters, but they do have a major influence on CIAM actions, particularly those involving highly technical problems.

Because of the world championships schedule, subcommittees usually meet once every two years. In between meetings, subcommittees communicate by mail. An important annual responsibility is to provide subcommittee proposals for the plenary meeting agenda and also to make recommendations concerning agenda items submitted by others pertaining to the particular subcommittee interest.

4. Records

All world record activities for aeromodeling in the U.S.A. are conducted under the jurisdiction of the AMA, with authority delegated by the NAA. FAI world records can only be established via officially sanctioned record attempts, such sanction being required in advance of the attempt and in accordance with fees, procedures, and requirements as detailed in the current AMA official Model Aircraft Regulations (rule book).

There are specific record categories for Free Flight (indoor and outdoor), Control Line and Radio Control. Within the categories are various classifications according to type of propulsion (or glider), seaplane, landplane, engine size, ceiling height (indoor). The breakdowns differ in the various categories so the rule book must be used to determine current records available.

Aeromodeling records are basically for duration, speed, distance and altitude, with variations in each category. The records are usually not related to FAI competition classes so that the restrictions of these classes typically do not apply. For example, the size and weight limits for models are usually the maximum for the category rather than for any class within the category. Similarly, for piston engines, the size is the maximum permissible for the category.

Record claims are processed by AMA, then submitted to NAA for review and forwarding to FAI. Only FAI has authority to issue world records. AMA and NAA serve as the authentication and paperwork processing agencies for FAI.

FAI records normally continue without regard to changes in model specifications or record requirements. For example, a speed record stands until exceeded by a higher speed regardless of changes to timing requirements, engine size limits or course layouts. This is in contrast to AMA national record procedure which wipes out previous records whenever basic conditions for the class are changed.

5. General

FAI rules are automatically AMA rules, without any AMA Contest Board action required. Variations of FAI classes can be established by the AMA Contest Board, but these are recognized separately.

There are special FAI rules concerning classes of meets, such as world championships, international and continental class meets. Included in these special rules are specific procedures to be followed and eligibility requirements. This is to assure that, when participants are involved from outside the host country, specific standards will be upheld.

The FAI rule book is known as the Sporting Code. There is a specific edition for Aeromodels, identified as Section 4 (other sections apply to other categories in the aviation spectrum—ballooning, soaring, parachuting, etc.). Section 1 of the Sporting Code is a separate publication covering common matters relating to contests, championships, and records which are the same for all FAI sport aviation categories.

Sections 1 and 4 together make up the complete sporting code for model aviation. In addition there is a book of FAI Statutes which details how the FAI operates as a whole. These publications are sold through AMA Headquarters—current prices available on request.

The FAI Sporting Code is usually published only as the need demands, typically with four or more years between editions. Current information is therefore usually a combination of the last published Sporting Code and subsequent supplements.

Additional information about FAI is not generally available, except as reported in the pages of various publications. In the past it has therefore been difficult for even close followers of FAI activity to keep track of AMA's constantly increasing participation. Hopefully, this compilation will make it easier to understand and share in the benefits of this prestigious and oldest of organized international aviation activities.

Bob Lutker, above, was the 1954 CL Speed World Champion. At the time he was in the USAF, stationed in North Africa. In that year, .305 cu. in. was the maximum engine size permitted. Top right: U.S. RC Scale Team for the 1969 International Contest in Germany consisted of Bridi, McCullough (back to camera) and Hester. The first Scale WC was run a year later. Adjacent right: Bernard McFadden congratulates Dick Korda on winning the 1939 Wakefield Contest in New Jersey. Model won with long 43-min.-plus flight. Far right: individual placings of first (Wisniewski), 3rd (Lee) and 5th (Carpenter) assured the CL Speed Team Championship for the U.S. in 1964 when the contest was in Hungary; CL Stunt Team also first.

RC Masters

HUNTSVILLE SITE SELECTED

The AMA officers responsible for the details of the RC Team Selection Program had a tougher than usual job in deciding the site for the final, and most important, contest to be held over the weekend of September 23-24–known as the RC Masters Team Selection Tournament. At hand were four proposals from RC clubs or organizations wishing to be host, and the decision was difficult because each had excellent and exciting aspects.

The proposal submitted by the Rocket City Radio Controllers, Huntsville, Ala., won out over those submitted by the Amarillo (Tex.) RC Society, Dallas (Tex.) RC Club and the Greater St. Louis (Mo.) Modeling Association. Each was evaluated with regard to site suitability, experience in such events by the host organization, lodging and transportation facilities, and publicity (public relations) potential for generating public participation.

All the proposals received high marks, but Huntsville's excelled in several aspects, particularly with regard to site (former municipal airport with 300-ft. wide runways and large ramp areas), lodging (motels and eating places within walking distance of the airport), and publicity (letters from local news media attesting to tremendous community support and enthusiasm).

When all the facts were at hand, the decision to accept the Huntsville offer had the unanimous recommendation of AMA's officers responsible for FAI program details, including current RC Team Selection Program Administrator Tom Rankin. AMA President Clemens concurred and authorized the decision announcement.

The 1972 RC Masters is the culmination of the current program to select the team to represent the U.S. in the 1973 RC Acrobatic World Championships expected to be held in Italy. Eligible to compete in the RC Masters will be the 1971 U.S. team members (Kraft, Whitley and Chidgey) plus the 10 top RC Class C Pattern flyers at the National Contest who have entered the Nats part of the team program ($10 fee in addition to regular Nats fee), and an additional 20 flyers who enter the points part of the program (after June 1; $10 fee to AMA HQ). The point accumulation system involves all AMA sanctioned meets of Class AA or larger (but excluding the Nats) having Class C or D Expert events and held from April 1 through September 4, 1972, with points awarded according to a formula taking into account the number of entries and placing at each contest. For full team program qualifying details, see the "AMA News" section of the April AAM, page 98.

RC MASTERS SPONSORS. The current industry sponsorship program is proceeding nicely, with the following pledges of support already in: E.K. Products, Inc.; Flying Models Magazine; Kraft Systems, Inc.; Model Airplane News; Model Rectifier Corp.; Northfield Precision (Ross Twin); Pro-Line Electronics; R/C Modeler Magazine; Top Flite Models, Inc.; SIG Mfg. Co., Inc.; World Engines, Inc. Industry sponsorship will be applied to contest expenses, especially for the most qualified judges and officials from diverse sections of the country, and for a printed program to be distributed to the public–a mini version of AMA's widely acclaimeed RC/WC program.

AMA News Bits

Scale Team Fund

Until just recently the Scale Team Fund was in bad shape. This is the fund composed of contributions which, combined with flyers' entry fees in the team program, aids in paying transportation costs of team members from their homes to and from the point of overseas departure for the World Championships. AMA funds and transportation assistance provided by the National Aeronautic Association covers the over-ocean and foreign travel.

But late last year the Greater St. Louis Modeling Association helped the Scale Fund by donating $100, and this spurred on the Chicago Scalemasters to hold an auction to benefit the fund. The auction brought in $135 over the "reserve price" set by the seller for each item, and the club kicked in an additional $15 to round out the contribution to $150. Another recent contribution of $75, was received from Bill and Irene Knapp.

What really set the Scale Team Fund on its feet was a donation of $1,265.30 from the Toledo Weak Signals Club. This was the "profit" from the raffle during this year's Toledo RC Conference. Great!

Control Line Team Fund

The team fund most in need is Control Line, and this group's need is actually the greatest because three teams are involved–Speed, Stunt and Team Race–and the latter team is composed of six members. Altogether 12 modelers, plus the team manager, are involved from all over the country, and as finances stood at the time of writing, about $300 more was needed to prevent the team members from having personal transportation costs. Additional team funds are needed quickly because the World Championships are in July (in Finland).

Individuals and clubs can help by making contributions which are tax-deductible–as Bob Lopshire and Bob Underwood recently did, respectively $100 and $15, or by organizing auctions and raffles to benefit the fund as described above. Another way is to purchase the commemorative '72 CL team embroidered shirt patch ($1.00 each) or a set of four self-stick airplane decals and one bumper sticker ($1.00 each); check or money order to AMA HQ, 806 15th St., N.W., Washington, D.C. 20005, should be marked FAI 72 CL Shirt Patch or FAI 72 CL Decal Package (better yet, send $2 to get both).

Contest PR

John Yells (AMA 16608), editor of Airflow, newsletter of AMA chartered RC Club of Rochester, cited one failing of his club's meet last year. He wrote: "We go to all the trouble to advertise our meet to get a good crowd, then we drop the ball by not plugging our sport more. We must make available to the spectators all the information that they can absorb, for the majority of them are unfamiliar with all the aspects of our sport."

In planning for this year, he suggested that the club engage a full time announcer to inform the public and contestants alike of the flyers' experience and equipment, as well as contest results as they occur.

AMA OFFICER DIRECTORY

The most recent complete directory was published in the April AAM, page 104. Three officials subsequently have changed, as follows.

Dist. I Contest Coordinator, Paul L. Penney, 8 Charlotte Dr., Andover, Mass. 01810, is the current office holder, replacing Elvin Bowe who served previously.

Dist. IX CL Contest Board Member, Michael C. Tallman, 3014 Exchange, Wichita, Kans. 67217, has replaced John Mason.

Dist. IX General Contest Coordinator, James T. Finley, 6540 E. Central, Wichita, Kans. 67206, replaces Ray Combs.

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

JUNE 3-4–NASHVILLE, TENN. (AAA) 9th Annual Mid-South RC Championships. Site: Percy Warner Park. B. Reuther CD, 6602 Highway 100, Nashville, Tenn. 37205. Sponsor: Middle Tennessee RC Society.

JUNE 3-4–BAKERSFIELD, CALIF. (A) Bakersfield RC Air Races. Site: Famoso. G. Spickler CD, 4208 Santa Cruz, Bakersfield, Calif. 93307. Sponsor: B.A.R.K.S.

JUNE 3-4–BATON ROUGE, LA. (AA) "Cajun RC Classic" Baton Rouge 11th Annual RC Meet. Site: Kleinpeter Field on Pecue Lane. H. Roberts CD, 9243 Hampton Way, Baton Rouge, La. 70814.

JUNE 3-4–ROCHESTER, N.Y. (AA) 13th Annual N.Y. State RC Championships. Site: Rochester, R. Walder CD, 129 Westmoreland Dr., Rochester, N.Y. 14620. Sponsor: RC Club of Rochester.

JUNE 3-4–MANKATO, MINN. (AAA) 1st Annual Mid-West CL Championships. Site: Madison East Shopping Center. D. Nirk CD, P. O. Box 165, Mankato, Minn. 56001. Sponsor: Mankato Modelers.

JUNE 3-4–TACOMA, WASH. (AA) Mt. Rainier Stunt & Scale RC Contest. Site: Algeo Field. B. Gale CD, 811-9th Ave., S.W., Puyallup, Wash. 98371. Sponsor: Mt. Rainier RC Society.

JUNE 3-4–LINCOLN, NEBR. (AA) Lincoln Sky Knights 13th Annual RC Contest. Site: Arrow Airport. D. Svoboda CD, 2461 Sewell, Lincoln, Nebr. 68502. Sponsor: Lincoln Sky Knights RC Club.

JUNE 3-4–SHREVEPORT, LA. (AAA) 1972 Louisiana State CL Model Airplane Championships. Site: Sky Demon Hobby Park. B. Lank CD, 3143 Rotan Ln., Dallas, Tex. 75229.

JUNE 3-4–ST. LOUIS, MO. (AAA) Gateway FF, CL & RC Championships. Site: Buder Park. R. Underwood CD, 4109 Concord Oaks Dr., St. Louis, Mo. 63128. Sponsor: Greater St. Louis Modeling Assn.

JUNE 4–HADLEY, MASS. (AA) Hampshire Showdown RC Air Races. Site: Hadley. B. Sparrow CD, 418 Meadow St., Agawam, Mass. 01001. Sponsor: Hampshire County Radio Controllers.

(Continued on page 98)

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JULY AAM

Quikie

(continued from page 78)

either bolts or rubber bands. Many fine articles have been written on fillet construction. Use any method you prefer. Performance won't suffer without the fillets; however, they do add quite a bit of strength to the fuselage sides and are recommended for the bolt-on wing.

After the wing is mounted, the fairing block is epoxied in place and shaped. Align the stabilizer and mount with epoxy. Do not remove any more triangular bracing in the stab saddle than is necessary. Next, glue in the bottom sheeting (grain crosswise) using Titebond. Brush a thin coat of epoxy in the battery-tank compartment, both sides of F-1, inside of the cowl, and the side of the top block that will be in the tank area. Immediately epoxy the top block in place. Carve and sand the fuselage to finished shape. Epoxy in the stab key, rudder and dorsal fin. Using Epoxolite or epoxy mixed with corn starch to the consistency of taffy, form a fillet on the inside of the cowl at the sides of F-1, and along the root of the rudder and stabilizer. Do not omit this last step. Finish and decorate the aircraft as desired.

In trimming the model there are two adjustments that may give you trouble. If your model tends to nose over easily while taxiing, you have too much weight on the nose-wheel. Bend the main gear forward until the ship almost drops on its tail with an empty tank. The airfoil used is a free-lance design and differential ailerons must be used if good roll performance is to be achieved. About six degrees more up than down. Keep the total aileron travel down to about 20 degrees—this is more than adequate.

The CG indicated on the plan gives best all-round performance, but may be moved back ¼" for better response to inside and outside snap rolls, lomcovaks, and inverted reverse spins.

Elevator travel should be 30 degrees up and 30 degrees down. Rudder throw should be all you can get short of hitting the elevator.

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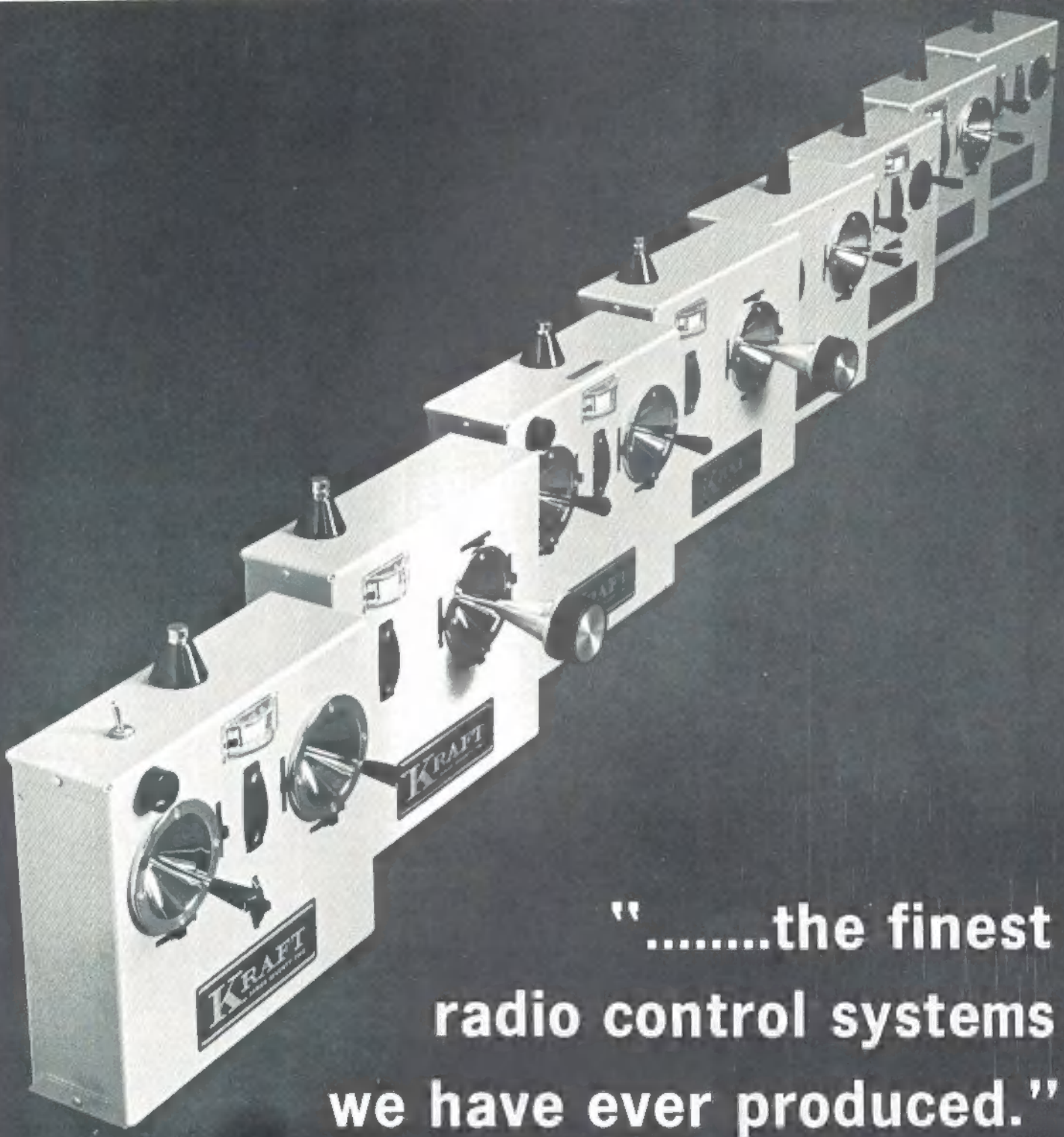

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